HADDAM VOLUNTEER FIRE COMPANY

ENGINE 6-13 REPLACEMENT BID SPECIFICATIONS

Intentions

It is the intent of these specifications to cover the furnishing and delivery to the purchaser of a complete vehicle equipped as hereinafter specified. With a view to obtaining the best results and the most acceptable apparatus, these specifications cover minimum requirements as to the type of construction, finish, and tests to which the apparatus must conform, together with certain details as to equipment and appliances to be furnished. Minor details of construction and materials, where not otherwise specified, are left to the discretion of the contractor, who shall be solely responsible for the design and construction. The apparatus shall conform to the requirements of the current (at the time of bid) NFPA standard to the extent as specified herein.

Qualification of Bidders

Bids will only be considered on vehicles constructed in the continental United States, whose manufacturers have an established reputation of permanency and reliability in the field of fire apparatus construction. Each manufacturer shall furnish satisfactory evidence of their ability to construct the apparatus as specified, and shall state the location of the factory where the complete apparatus will be built. If the chassis, body, and water tank are manufactured in different facilities, the location of each facility shall be stated in the bid. Experimental apparatus or apparatus using a subcontracted body, chassis, or aerial device will not be acceptable.

Completion Time

The apparatus must be delivered completed to the purchaser within 1 year of original contract signing.

Delivery

The apparatus shall be delivered under its own power to assure adequate break-in while under warranty. It shall first be transported to the local service facility, where final inspection and preparation will be performed, including mounting of related equipment. The apparatus will then be delivered to the Purchaser's location.

Post-Delivery Training

On one (1) mutually agreeable date after delivery, a certified delivery engineer shall familiarize those persons designated by the purchaser with the basic operation of the apparatus and its components.

This shall be a full instructional program including both classroom and practical or "hands on" training. Limited programs or "drop-off" type deliveries are unacceptable.

Contract

These specifications, together with any documents required herein, shall be included in the final contract. Each bidder shall submit a copy of their proposed contract form.

Exceptions

Substitutions, deviations, clarifications, or exceptions to the technical specifications must be listed on a separate page marked, "EXCEPTIONS", and must be accompanied by adequate supportive data to allow the Fire Chief to determine acceptability. Proposals that are found to have deviations without listing them will be rejected. Components identified by brand names are available to all prospective bidders and exceptions shall not be allowed on these items.

NFPA Compliance

The supplied components of the apparatus shall be compliant with NFPA 1901, 2009 edition.

Approval Drawings

A general arrangement drawing depicting the vehicles appearance shall be provided. The drawing shall consist of left side, right side, front, and rear elevation views.

Vehicles requiring pump controls shall include a general arrangement view of the pump operator`s position, scaled the same as the elevation views.

Electronic Manuals

Two (2) copies of all operator, service, and parts manuals must be supplied at the time of delivery in electronic format (CD-ROMs). The electronic manuals shall include the following information:

- Operating Instructions, descriptions, specifications, and ratings of the cab, chassis, body, aerial (if applicable), installed components, and auxiliary systems.
- Warnings and cautions pertaining to the operation and maintenance of the fire apparatus and firefighting systems.
- Charts, tables, checklists, and illustrations relating to lubrication, cleaning, troubleshooting, diagnostics, and inspections.
- Instructions regarding the frequency and procedure for recommended maintenance.
- Maintenance instructions for the repair and replacement of installed components.
- Parts listing with descriptions and illustrations for identification.
- Warranty descriptions and coverage.

The CD-ROM shall incorporate a navigation page with electronic links to the operator`s manual, service manual, parts manual, and warranty information, as well as instructions on how to use the

manual. Each copy shall include a table of contents with links to the specified documents or illustrations.

The CD must be formatted in such a manner as to allow not only the printing of the entire manual, but to also the cutting, pasting, or copying of individual documents to other electronic media, such as electronic mail, memos, and the like.

A find feature shall be included to allow for searches by text or by part number.

These electronic manuals shall be accessible from any computer operating system capable of supporting portable document format (PDF). Permanent copies of all pertinent data shall be kept file at both the local dealership and at the manufacturer`s location.

Safety Video

Since video is much more effective than written documentation and can be replayed for new personnel and as a refresher for existing personnel, an apparatus safety video, in DVD format shall be provided at time of delivery. This video shall address key safety considerations for personnel to follow when they are driving, operating, and maintaining the apparatus. Safety procedures for the following shall be included on the video: vehicle pre trip inspection, chassis operation, pump operation and maintenance.

Vehicle Inspection Program Certification

To assure the vehicle is built to current NFPA standards, the apparatus, in its entirety, shall be third-party, independent, audit-certified through Underwriters Laboratory (UL) that it is built and complies to all applicable standards in the current edition of NFPA 1901. The certification includes: all design, production, operational, and performance testing of not only the apparatus, but those components that are installed on the apparatus (no exception).

A placard shall be affixed in the driver's side area stating the third party agency, the date, the standard and the certificate number of the whole vehicle audit.

Pump Test

The pump shall be tested, approved, and certified by Underwriter's Laboratory at the manufacturer's expense. The test results and the pump manufacturer's certification of hydrostatic test; the engine manufacturer's certified brake horsepower curve; and the manufacturer's record of pump construction details shall be forwarded to the Fire Department.

Generator Test

If the unit has a generator, the generator shall be tested, approved, and certified by Underwriters Laboratories at the manufacturer's expense. The test results shall be provided to the Fire Department at the time of delivery.

Approval Drawings

A drawing of the proposed apparatus shall be provided for approval before construction begins. The sales representative shall also have a copy of the same drawing. The finalized and approved drawing shall become part of the contract documents. This drawing shall indicate the chassis make and model, location of the lights, siren, horns, compartments, major components, etc.

A "revised" approval drawing of the apparatus shall be prepared and submitted by the manufacturer to the purchaser showing any changes made to the approval drawing.

Single Source Manufacturer

Bid will be entertained from a single source fire apparatus manufacturer. A single source manufacturer is defined as a manufacturer who designs, engineers and manufactures the entire apparatus in the factory of the bidder. The use of commonly incorporated components such as the diesel engine, the transmission, the pump, lighting fixtures, etc. is acceptable. However, calling the cab/chassis/drivetrain or the outriggers/torque box/aerial device a "component" shall not be acceptable. Single source warranty and service provision from apparatus manufacturer and its distributors, sales representatives and service network shall be provided to insure parts availability and undivided warranty responsibility. There shall be no exceptions to these conditions.

Discontinuance Policy

The apparatus manufacturer furnishes and installs components which are manufactured by 3rd Party Vendors. From time to time, these products are either changed or discontinued by the manufacturer. The apparatus manufacturer reserves the right to replace a discontinued 3rd Party Vendor manufactured component with an equivalent model approved by the purchaser.

Purchaser Rights

The Purchaser reserves the right to accept or reject any bid. The purchaser also reserves the right to award in their best interest and reserves the right to waive any formalities.

U.S.A. Manufacturer

The entire apparatus shall be assembled within the borders of the Continental United States to insure more readily available parts (without added costs and delays caused by tariffs and customs) and service, as well as protecting the purchaser should legal action ever be required.

Bid Sequence

For ease of evaluation, all bid proposals shall be submitted in the same order as the fire department's specification. **NO EXCEPTIONS.**

Pre-Construction Conference

After award of the contract, and prior to construction of the apparatus, a pre-construction conference shall be held at the facility of the manufacturer. A provision shall be provided in the bid price for all travel, food and lodging for up to three (3) Fire Department representatives.

Final Inspection

A final inspection trip shall be provided at the manufacturer's facility, prior to delivery of the completed apparatus. A provision shall be provided in the bid price for all travel, food and lodging for up to three (3) Fire Department representatives.

Dealer Conducted Pre-Delivery Inspection

Following the apparatus' delivery to the local Dealer/Service Center, the vehicle will undergo a thorough inspection. The inspection will include (but will not be limited to) the following:

* Motor, drivetrain, and transmission inspection

* Interior/Exterior cab and body inspection (paint, graphics, structure, etc.)

* Emergency, scene, ground, and step lighting

* Fire pump inspection

* Generator, light tower, and electrical cord reel

Additionally and prior to delivery to the Fire Department, the apparatus' engine oil shall be changed and new engine oil filters shall be installed.

Standard 2 Year Warranty

The apparatus manufacturer shall provide a full 2-year standard warranty. All components manufactured by the apparatus manufacturer shall be covered against defects in materials or workmanship for a 2-year period. All components covered by separate suppliers such as engines, transmissions, tires, and batteries shall maintain the warranty as provided by the component supplier. A copy of the warranty document shall be provided with the proposal.

Warranty 10 Year Structural

The apparatus manufacturer shall provide a comprehensive 10 year/100,000 mile structural warranty. This warranty shall cover all structural components of the stainless steel body manufactured by the apparatus manufacturer against defects in materials or workmanship for 10 years or 100,000 miles, whichever occurs first. Excluded from this warranty are all hardware, mechanical items, electrical items, or paint finishes. A copy of the warranty document shall be provided with the proposal.

Lifetime Frame Warranty

The apparatus manufacturer shall provide a full lifetime frame warranty. This warranty shall cover all apparatus manufacturer designed frame, frame members, and cross-members against defects in materials or workmanship for the lifetime of the covered apparatus. A copy of the warranty document shall be provided with the proposal. Frame warranties that do not cover cross-members for the life of the vehicle shall not be acceptable.

10 Year/100,000 Mile Structural Warranty

The apparatus manufacturer shall provide a comprehensive 10 year/100,000 mile structural warranty. This warranty shall cover all structural components of the cab and/or body manufactured by the apparatus manufacturer against defects in materials or workmanship for 10 years or 100,000 miles, whichever occurs first. Excluded from this warranty are all hardware, mechanical items, electrical items, or paint finishes. A copy of the warranty document shall be provided with the proposal.

10 Year Stainless Steel Plumbing Warranty

The apparatus manufacturer shall provide a full 10-year stainless steel plumbing components warranty. This warranty shall cover defects in materials or workmanship of apparatus manufacturer designed foam/water plumbing system stainless steel components for 10 years. A copy of the warranty document shall be provided with the proposal.

10 Year Paint and Corrosion Warranty

The apparatus manufacturer shall provide a 10-year limited paint and corrosion perforation warranty. This warranty shall cover paint peeling, cracking, blistering, and corrosion provided the vehicle is used in a normal and reasonable manner.

Corrosion perforation shall be covered 100% for 10 years. Corrosion perforation is defined as complete penetration through the exterior metal of the apparatus.

The warranty period shall begin upon delivery of the apparatus to the original user-purchaser. A copy of the warranty document shall be provided with the proposal.

UV paint fade shall be covered in a separate warranty supplied by the paint manufacture and shall be for a minimum of 10 years.

10 Year Frame Assembly Corrosion Warranty

The chassis manufacturer shall provide a 10 year corrosion warranty on the chassis frame assembly. This warranty shall cover the chassis frame rails, frame rail liners (if equipped), front frame extensions, chassis cross members (engine rearward) and battery tray brackets for a period of 10 years after the date on which the vehicle is delivered to the original purchaser. A copy of the warranty document shall be provided with the proposal. Please refer to warranty document for complete details and exclusions.

Additional Specifications

In addition to the previously listed specifications the bidder must meet the specifications in one of the four additional specification labeled Option A, Option B, Option C, and Option D. Those additional specifications carry four chassis options. The bidder must meet the complete specifications in one of the options and cannot pick and choose from the different options. The option the bidder chooses to bid must be listed in their bid. The option chosen must be met in its entirety. NO ACCEPTIONS!

Bumper

A heavy duty 10" high steel channel type front bumper shall be provided. The front corners of the bumper shall be angled at 45 degrees to reduce swing clearance. The bumper shall be painted gloss black color.

Front Bumper Extension

The bumper shall be extended approximately 20" from the face of the cab as required.

Bumper Gravel Shield

The extended front bumper gravel shield shall be made of 1/8" (.125") aluminum treadplate material.

Bumper Hose Tray Lid

The center bumper tray shall have a diamond plate lid. The lid shall be hinged and shall be secured in the closed position by a D-Ring latch and held open with a pneumatic shock.

Bumper Tray - Center

A hose tray constructed of 1/8" aluminum shall be recessed into the front bumper extension. The tray shall be located in the center of the bumper and be approximately 14" deep. The tray shall hold 150' 1.75" double jacket hose.

Flooring Material

Slatted Duradek fiberglass flooring shall be provided in the center bumper tray providing superior drainage and ventilation.

Frame Rail Construction

The frame shall consist of two (2) C-channel frame rails with heavy-duty crossmembers. Each frame rail shall have the following minimum specifications in order to minimize frame deflection under load and thereby improve vehicle ride and extend the life of the frame:

Dimensions: 12" x 3-1/2" x 3/8"

Material: 110,000-psi minimum yield strength, high strength, low alloy steel

Section Modulus: 20.90 cu. in.

Resisting Bending Moment (RBM): 2,299,000 in. lbs.

There shall be a minimum of six (6) crossmembers joining the two (2) frame rails in order to make the frame rigid and hold the rails/liners in alignment. The crossmembers shall be a combination of a formed steel C-channel design along with heavy duty steel fabricated designs as required for the exact chassis configuration. The crossmembers shall be attached to the frame rails with not less than four (4) bolts at each end arranged in a bolt pattern to adequately distribute the crossmember load into the rail/liner and minimize stress concentrations.

All frame fasteners shall be high-strength, Grade 8, flanged-head threaded bolts and nuts for frame strength, durability, and ease of repair. The nuts shall be Stover locknuts to help prevent loosening. The frame fasteners shall be tightened to the proper torque at the time of assembly.

The frame rails and frame liners shall be finished with black paint. The frame crossmembers and frame-mounted components (suspensions, axles, air tanks, battery boxes, fuel tank, etc.) shall be painted black.

The apparatus manufacturer shall supply a full lifetime frame warranty including crossmembers against defects in materials or workmanship. Warranties that provide a lifetime warranty for only the frame rails, but not the crossmembers, are not acceptable.

The custom chassis frame shall have a wheel alignment in order to achieve maximum vehicle road performance and to promote long tire life. The alignment shall conform to the manufacturer`s internal specifications. All wheel lug nuts and axle U-bolt retainer nuts shall be tightened to the proper torque at the time of alignment. The wheel alignment documentation shall be made available at delivery upon request.

Galvanized Frame Assembly

The chassis frame rails, front frame extensions, rear subframe (Urban Interface), crossmembers and battery brackets shall have a hot-dipped galvanized zinc coating in place of standard for increased corrosion resistance. The coating shall be done in compliance with the ASTM A123 Standard.

Front Axle

The vehicle shall utilize an ArvinMeritor FL-943, 5" drop beam front axle with a rated capacity of 21,000 lbs. It shall have "easy steer" knuckle pin bushings and 68.83" kingpin centers. The axle shall be of I-beam construction and utilize grease-lubricated wheel bearings. The vehicle shall have a nominal cramp angle of 45 degrees, plus two (+ 2) degrees to minus three (- 3) degrees including front suction applications.

The front axle hubs shall be made from ductile iron and shall be designed for use with 10 hole hub-piloted wheels in order to improve wheel centering and extend tire life.

The front springs shall be parabolic tapered, minimum 4" wide x 54" long (flat), minimum three (3) leaf, progressive rate with bronze bushings and a capacity of 21,000 lbs. at the ground. Tapered leaf springs provide a 20% ride improvement over standard straight spring systems.

The vehicle shall be equipped with a Sheppard model M-110 integral power steering gear, used in conjunction with a power assist cylinder. The steering assembly shall be rated to statically steer up to a maximum front axle load of 21,000 lbs. Relief stops shall be provided to reduce system pressure upon full wheel cut. The system shall operate mechanically should the hydraulic system fail.

A 2-year/unlimited miles parts and 2-year labor axle warranty shall be provided as standard by ArvinMeritor Automotive.

In order to achieve maximum vehicle road performance and to promote long tire life, there shall be a wheel alignment. The alignment shall conform to the manufacturer`s internal specifications. All wheel lug nuts and axle U-bolt retainer nuts shall be tightened to the proper torque at the time of alignment. The wheel alignment documentation shall be made available at delivery.

Shock Absorbers Front

Koni model 90 shock absorbers shall be provided for the front axle. The shocks shall be three way adjustable.

The shocks shall be covered by the manufacturer`s standard warranty.

Rear Axle

The vehicle shall utilize an ArvinMeritor RS-30-185, 31,000 lb. single rear axle with single reduction hypoid gearing and a manufacturer`s rated capacity of 31,000 lbs. The axle shall be equipped with oil-lubricated wheel bearings with ArvinMeritor oil seals.

The rear axle hubs shall be made from ductile iron and shall be designed for use with 10 hole hub-piloted wheels to improve wheel centering and extend tire use.

A 2-year/unlimited miles parts and 2-year labor rear axle warranty shall be provided as standard by ArvinMeritor Automotive.

ONSPOT AUTOMATIC SNOW CHAINS

Onspot automatic snow chains shall be provided in front of the rear axle of the vehicle. An electric switch shall be mounted in the cab to provide 12 volts to an air solenoid mounted on the vehicles frame. Compressed air to the solenoid from the vehicle's onboard air system shall activate the chains. When the chains are deactivated, the solenoid exhausts the air provided to the chain units and self-contained return springs bring the chain wheels back to their nested position.

Rear Suspension

The rear suspension shall be a Reyco model 79KB. The suspension shall include linear-rate slipper type leaf springs that eliminate spring eyes and shackles. The suspension shall also include one (1) fixed torque arm, one (1) adjustable torque arm and cast spring hangers. The suspension shall be rated for the maximum axle capacity.

Front Wheels

The vehicle shall have two (2) polished (on outer wheel surfaces only) Alcoa Dura Bright aluminum disc wheels. They shall be forged from one-piece corrosion-resistant aluminum alloy and sized appropriately for the tires.

Front Wheel Trim Package

The front wheels shall have stainless steel lug nut covers (chrome plated steel lug nut covers not acceptable). The front axle shall be covered with American made Real Wheels brand mirror finish, 304L grade, non-corrosive stainless steel universal baby moons. All stainless steel baby moons shall carry a lifetime warranty plus a 2 year re-buffing policy. There shall be two (2) baby moons and twenty (20) lug nut covers.

Rear Wheels

The vehicle shall have four (4) polished (on outer wheel surfaces only) Alcoa Dura Bright aluminum disc wheels. They shall be forged from one-piece corrosion-resistant aluminum alloy and sized appropriately for the tires.

Rear Wheel Trim Package

The rear wheels shall have stainless steel lug nut covers (chrome plated steel lug nut covers not acceptable), or American made chrome plated plastic lug nut covers. The rear axle shall be covered with American made Real Wheels brand mirror finish, 304L grade, non-corrosive stainless steel, spring clip band mount high hats, DOT user friendly. All stainless steel high hats shall carry a lifetime warranty plus a 2 year re-buffing policy. There shall be two (2) high hats and twenty (20) lug nut covers.

Aluminum Wheel Finish

A Dura-Brite high performance sealant shall be supplied on each aluminum wheel. The sealant shall not yellow under UV light exposure and shall impede staining and corrosion of the aluminum wheel.

Valve Stem Extensions

Each inside rear wheel on the rear axle shall have valve extensions.

Front Tires

The front tires shall be two (2) Michelin 385/65R22.5, XFE tubeless type 20 PR radial tires with XFE highway tread.

The tires with wheels shall have the following weight capacity and speed rating:

Max front rating 22,800 @ 65 mph.

Max front rating with Alco aluminum wheels - 24,400 @ 65 MPH (intermittent fire service rating if GAW is over 22,800)

The wheels and tires shall conform to the Tire and Rim Association requirements.

Rear Tires

The rear tires shall be Michelin 315R22.5 tubeless type radial tires with XDN2 mud and snow tread.

The tires with wheels shall have the following weight capacity:

33,080 lbs. (dual) @ 75 MPH.

The wheels and tires shall conform to the Tire and Rim Association requirements.

A set of Roller Chains must be supplied for the rear tires.

Tire Pressure Indicators

The apparatus shall be provided with Real Wheels AirGuard LED tire pressure indicating valve stem caps. When the tire is under inflated by 5-10 PSI, the LED indicator on the cap shall flash red. The indicator housings shall be shock resistant and constructed from polished stainless steel. The indicators shall be easily re-calibrated by simply removing and re-installing them.

Front Brakes

The front axle shall be equipped with Meritor DiscPlus EX225H 17 inch disc brakes.

The brakes shall be covered by the manufacturer`s standard warranty which is three years, unlimited mileage and parts only.

Rear Brakes

The rear axle shall be equipped with ArvinMeritor 16-1/2" x 7" S-cam brakes with cast brake drums. Q-Plus shoes shall be provided with up to 31,000 lb. axle ratings and P-Type shoes with over 31,000 lb. axle ratings.

The rear axle brakes shall be furnished with automatic slack adjusters. ArvinMeritor brand shall be supplied on RS-24-160 and RS-25-160 axles, and Haldex brand shall be supplied on RS-26-185 and RS-30-185 axles.

A 3 year/unlimited miles parts and 3 year labor rear brake warranty shall be provided as standard by ArvinMeritor Automotive. The warranty shall include bushings, seals, and cams.

Brake System

The vehicle shall be equipped with air-operated brakes and an anti-lock braking system (ABS). The brake system shall meet or exceed the design and performance requirements of the current Federal Motor Vehicle Safety Standard (FMVSS)-121, and the test requirements of the current NFPA 1901 Standard.

A dual-treadle brake valve shall correctly proportion the braking power between the front and rear systems. The air system shall be provided with a rapid pressure build-up feature, designed to meet current NFPA 1901 requirements, to allow the vehicle to begin its emergency response as quickly as possible.

A pressure-protection valve shall be installed to prevent use of the air horns or other air-operated devices should the air system pressure drop below 85 psi. This feature is designed to prevent inadvertent actuation of the emergency/parking brakes while the vehicle is in motion.

Two (2) air pressure needle gauges, one (1) each for front and rear air pressure, with a warning light and buzzer shall be installed at the driver`s instrument panel.

The braking system shall be provided with a minimum of three (3) air tank reservoirs for a total air system capacity of 5,214 cu. in. One (1) reservoir shall serve as the wet tank and a minimum of one (1) tank shall be supplied for each of the front and rear axles. The total system shall carry a sufficient volume of air to comply with FMVSS-121.

Tank Capacities in Cubic Inches:

Wet	Front	Rear	Total
1,738	1,738	1,738	5,214

Spring-actuated emergency/parking brakes shall be installed on the rear axle.

A Bendix-Westinghouse SR-1 valve, in conjunction with a double check valve system, shall provide automatic emergency brake application when the air brake system pressure falls below 40 psi in order to safely bring the vehicle to a stop in case of an accidental loss of braking system air pressure.

A four-channel Wabco ABS shall be provided to improve vehicle stability and control by reducing wheel lock-up during braking. This braking system shall be fitted to both front and rear axles. All electrical connections shall be environmentally-sealed for protection against water, weather, and vibration.

The system shall constantly monitor wheel behavior during braking. Sensors on each wheel transmit wheel speed data to an electronic processor, which shall detect approaching wheel lock-up and instantly modulate (or pump) the brake pressure up to five (5) times per second to prevent wheel lock-up. Each wheel shall be individually controlled. To improve field performance, the system shall be equipped with a dual-circuit design configured in a diagonal pattern. Should a malfunction occur in one circuit, that circuit shall revert to normal braking action. A warning light at the driver`s instrument panel shall signal a malfunction.

The system shall also be configured to work in conjunction with all auxiliary engine, exhaust, or driveline brakes to prevent wheel lock-up.

To improve maintenance troubleshooting, provisions in the system for an optional diagnostic tester shall be provided. The system shall test itself each time the vehicle is started, and a dash-mounted light shall go out once the vehicle is moving above 4 MPH.

A 3 year/300,000 mile parts and labor Anti-Locking Braking System (ABS) warranty shall be provided as standard by Meritor Automotive.

Park Brake Release

One (1) Bendix-Westinghouse PP-5 parking brake control valve shall be supplied on the lower dash panel within easy reach of the driver.

Electronic Stability Control

The apparatus shall be equipped with a G4 4S4M Electronic Stability Control (ESC) system that combines the functions of Roll Stability Control (RSC) with the added capability of yaw - or rotational – sensing.

RSC focuses on the vehicle's center of gravity and the lateral acceleration limit or rollover threshold. When critical lateral acceleration thresholds are exceeded, RSC intervenes to regulate the vehicle's deceleration functions. The added feature of ESC is to automatically intervene to reduce the risk of the vehicle rotating while in a curve or taking evasive action, prevents drift out through selective braking, and controlling and reducing vehicle speed when lateral acceleration limits are about to be exceeded.

Intervention by the system occurs in three forms - engine, retarder and brake control. The ESC system uses several sensors to monitor the vehicle. These include a steering wheel angle sensor, lateral accelerometer, and yaw position sensor. ESC constantly monitors driving conditions and intervenes if critical lateral acceleration is detected or if the vehicle begins to spin due to low friction surfaces. The system provides control of engine and retarder torque as well as automatically controlling individual wheels to counteract both over steer and under steer.

To further improve vehicle drive characteristics, the unit shall be fitted with Automatic Traction Control (ATC). This system shall control drive wheel slip during acceleration from a resting point. An extra solenoid valve shall be added to the ABS system. The system shall control the engine and brakes to improve acceleration slip resistance. The system shall have a dash mounted light that shall come on when ATC is controlling drive wheel slip.

3 year/300,000 miles parts and labor warranties for ESC, RSC, and ATC shall be provided as standard by Meritor Automotive.

Brake System Fittings

All air brake system hoses on the chassis shall be connected by use of compression fittings. Includes air lines in the chassis cab (if equipped).

Air Dryer

The chassis air system shall be equipped with a Bendix-Westinghouse AD-9 air dryer to remove moisture from the air in order to help prevent the air lines from freezing in cold weather and prolong the life of the braking system components.

Air Inlet

A 1/4" brass quick-release air inlet with a male connection shall be provided. The inlet shall allow a shoreline air hose to be connected to the vehicle, discharging air directly into the wet tank of the air brake system. It shall be located driver door jamb.

Air Inlet Auto-Eject

A Kussmaul Air Auto-Eject #091-28 air line disconnect shall be installed for the air inlet connection. The air line will automatically disconnect when the vehicle is

started. A Yellow weatherproof gasketed cover, which automatically closes when the air line is ejected, shall be supplied.

The Auto-Eject shall be located outside driver's door next to handrail.

Air Lines

Air brake lines shall be constructed of color coded nylon tubing routed in a manner to protect them from damage. Brass fittings shall be provided.

Air Horns

Dual Grover air horns shall be provided, connected to the chassis air system. The horns shall be mounted through the front bumper. The front bumper shall have two (2) holes punched to accommodate the horns. A pressure protection valve shall be installed to prevent the air brake system from being depleted of air pressure.

Transmission Programming

The transmission shall be re-programmed so that when "D" is selected, the transmission will shift from 1st through 4th gear and pressing "MODE" will allow the transmission to shift up to 5th gear. Downshift pre-select will remain as standard (4th gear).

Transmission Selector

A push-button transmission shift module, Allison model 29538373, shall be located to the right side of the steering column within easy reach of the driver. The shift position indicator shall be indirectly lit for after dark operation. The shift module shall have a "Do Not Shift" light and a "Service" indicator light. The shift module shall have means to enter a diagnostic mode and display diagnostic data including oil life monitor, filter life monitor, transmission health monitor and fluid level. A transmission temperature gauge with warning light and buzzer shall be installed on the cab instrument panel.

Transmission Fluid

The transmission fluid shall be TransSynd synthetic.

Vehicle Speed

Electronic speed limiting set at 60 MPH as required by NFPA 1901.

Engine/Transmission Package

Engine

The vehicle shall utilize a Cummins ISX12 engine as described below:

- • 500 Horsepower
  • Six (6) cylinder
  • Variable Geometry Turbocharged
  • Charge Air Cooled (CAC) 4-cycle diesel
  • Cummins XPI high pressure fuel injection system
  • Fuel cooler (when equipped with a fire pump)
  • 729 cu.in. displacement
  • 500 gross BHP at 1800 RPM and a peak torque of 1645 lb.ft. at 1200 RPM with a governed RPM of 2100
  • Bore and stroke shall be 5.11 x 5.91
  • Compression ratio shall be 17:1
  • Engine lubrication system shall have a minimum capacity, to include filter, of 43 quarts
  • Cooled Exhaust Gas Recirculation (EGR)
  • Delco-Remy 39 MD-HD 12 volt starter
  • Interacta System
  • Coolant filter with shut-off and corrosion inhibiting additive
  • 18.7 cubic foot per minute air compressor
  • After treatment system consisting of a oxidation catalyst and diesel particulate filter and selective catalyst reduction system
  • Ember separator compliant with 2009 NFPA 1901 standard
  • The engine shall be compliant with 2013 EPA Emission standards
- Curve reference for ISCAAN FR20389EV

The engine air intake shall draw air through the front cab grill. The intake opening shall be located on the officer (right) side behind front cab face with a plenum that directs air to the air filter. The air cleaner shall be a 11" diameter dry type that is easily accessed for service. Air cleaner intake piping shall be made from aluminized steel tubing with flexible rubber hoses. Air cleaner intake piping clamps shall be heavy-duty, constant-torque, T-bolt clamps to ensure proper sealing under all temperatures in order to keep dust and other contaminants out of the engine intake air stream and protect the engine.

The engine exhaust piping shall be a minimum of 4" diameter welded aluminized steel tubing. The muffler shall be mounted horizontally under the right-hand frame rail in back of the cab in order to minimize heat transmission to the cab and its occupants. The exhaust shall be directed away from the vehicle on the right side ahead of the rear wheels in order to keep exhaust fumes as far away as possible from the cab and pump operator position.

A 5-year/100,000 miles parts and labor warranty will be provided as standard by Cummins.

A copy of the Engine Installation Review stating the engine installation meets Cummins recommendations shall be provided as requested. The engine installation shall not require the operation of any type of "power-down" feature to meet engine installation tests.

Transmission

The vehicle shall utilize an Allison EVS4000P, electronic, 5-speed automatic transmission.

A transmission oil temperature gauge with warning light and buzzer shall be installed on the cab instrument panel to warn the driver of high oil temperatures that may damage the transmission.

The transmission shall have a gross input torque rating of 1675 lb. ft. and a gross input power rating of 580 HP.

The gear ratios shall be as follows:

1 - 3.51

2 - 1.91

3 - 1.43

4 - 1.00

5 - .74

R - 4.80

The transmission shall be equipped with a fluid level sensor (FLS) system, providing direct feedback of transmission oil level information to the operator.

The transmission shall have a lubricant capacity of 51 quarts.

A water-to-oil transmission oil cooler shall be provided to ensure proper cooling of the transmission when the vehicle is stationary (no air flow).

The transmission shall contain two engine driven PTO openings located at the 1 and 8 o`clock positions. The automatic transmission shall be equipped with a power lock-up device. The transmission lock-up shall prevent down shifting of transmission when engine speed is decreased during pump operations, thereby maintaining a constant gear ratio. Transmission lock-up shall be automatically activated when placing pump in gear. Transmission lock-up shall be automatically deactivated when disengaging pump for normal road operation.

A 5-year/unlimited miles parts and labor warranty shall be provided as standard by Allison Transmission.

Jacobs Engine Brake

One (1) Jacobs engine brake shall be installed to assist in slowing and controlling the vehicle as required by NFPA 1901 for vehicles with gross vehicle weight ratings (GVWR) of 36,000 lbs. or greater. An on-off control switch and a high-medium-low selector switch shall be mounted in the cab accessible to the driver.

When activated, the Jacobs engine brake shall cut off the flow of fuel to the cylinders and alter the timing of the exhaust valves. This shall transform the engine into a high-pressure air compressor, driven by the wheels, and the horsepower absorbed by the engine in this mode shall slow the vehicle. The selector switch allows the driver to select the amount of retarding power.

When the on-off switch is in the "on" position, the engine brake shall be automatically applied whenever the accelerator is in the idle position and the automatic transmission is in the lock-up mode. If the accelerator is depressed or if the on-off switch is placed in the "off" position, the engine brake shall immediately release and allow the engine to return to its normal function.

Engine Cooling Package

Radiator

The cooling system shall include an aluminum tube-and-fin radiator with a minimum of 1,408 total square inches of frontal area to ensure adequate cooling under all operating conditions. There shall be a drain valve in the bottom tank to allow the radiator to be serviced. A sight glass shall be included for quick fluid level assessment. The radiator shall be installed at the prescribed angle in order to achieve the maximum operational effectiveness. This shall be accomplished according to established work instructions and properly calibrated angle measurement equipment.

Silicone Hoses

All radiator and heater hoses shall be silicone. Pressure compensating band clamps shall be used to eliminate hose pinching on all hoses 3/4" diameter and larger. All radiator hoses shall be routed, loomed, and secured so as to provide maximum protection from chafing, crushing, or contact with other moving parts.

Coolant

The cooling system shall be filled with a 50/50 mixture of water and antifreeze/coolant conditioner to provide freezing protection to minus 40 (- 40) degrees F for operation in severe winter temperatures.

Coolant Recovery

There shall be a coolant overflow recovery system provided.

Charge Air Cooler System

The system shall include a charge air cooler to ensure adequate cooling of the turbocharged air for proper engine operation and maximum performance.

Charge Air Cooler Hoses

Charge air cooler hoses shall be made from high-temperature, wire-reinforced silicone to withstand the extremely high temperatures and pressures of the turbocharged air. The hoses shall incorporate a flexible hump section to allow motion and misalignment of the engine relative to the charge air cooler. Charge air cooler hose clamps shall be heavy-duty, constant-torque, T-bolt clamps to ensure proper sealing under all temperatures in order to keep dust and other contaminants out of the engine intake air stream and protect the engine.

Fan/Shroud

The fan shall be 30" in diameter with eleven (11) blades for maximum airflow and dynamic balance. It shall be made of nylon for strength and corrosion resistance. The fan shall be installed with grade 8 hardware which has been treated with thread locker for additional security. A fan shroud attached to the radiator shall be provided to prevent recirculation of engine compartment air around the fan in order to maximize the cooling airflow through the radiator. The fan shroud shall be constructed of fiber-reinforced high temperature plastic. The shroud shall be specifically formed with curved surfaces which improves air flow and cooling.

Transmission Cooler

The cooling system shall include a liquid-to-liquid transmission cooler capable of cooling the heat generated from the transmission. When a transmission retarder is selected, the cooler shall have an increased capacity to handle the additional heat load.

Fuel System

One (1) 65 gallon fuel tank shall be provided. The tank shall be of an all-welded, aluminized-steel construction with anti-surge baffles and shall conform to all applicable Administration (FHWA) 393.65 and 393.67 standards. The tank shall be mounted below the frame rails at the rear of the chassis for maximum protection. The tank shall be secured with two (2) wrap-around T-bolt type stainless steel straps. Each strap shall be fitted with protective rubber insulation and shall be secured with Grade 8 hardware. This design allows for tank removal from below the chassis.

The fuel tank shall be equipped with a 2" diameter filler neck. The filler neck shall extend to the rear of the vehicle behind the rear tires and away from the heat of the exhaust system as required by NFPA 1901 Standard for Automotive Fire Apparatus. The open end of the filler neck shall be equipped with a twist-off filler cap with a retaining chain.

The tank shall be plumbed with top-draw and top-return fuel lines in order to protect the lines from road debris. Bottom-draw and/or bottom-return fuel lines are not acceptable. A vent shall be provided at the top of the tank. The vent shall be connected to the filler neck to prevent splash-back during fueling operations. A .50" NPT drain plug shall be provided at the bottom of the tank.

The tank shall have a minimum useable capacity of 65 gallons of fuel with a sufficient additional volume to allow for thermal expansion of the fuel without overflowing the vent.

A fuel pump shall be provided and sized by the engine manufacturer as part of the engine.

Fuel Line Hose

Wire braided fuel hose meeting SAE J-1402 shall be provided for the chassis fuel system. The hose shall have a working temperature rating of -55 degree F to 300 degree F.

The ends of the hose shall have connections that shall allow the hose to be reattached if removed.

420 Amp Alternator

There shall be a 420 amp Leece Neville alternator installed as specified. The alternator shall be a Leece Neville 7890JB series brushless type with integral rectifier and adjustable voltage regulator with an output of 275 amps per NFPA 1901 rating (320 amps per SAE J56).

Battery System

The manufacturer shall supply four (4) heavy duty Group 31 12-volt maintenance-free batteries. Each battery shall be installed and positioned so as to allow easy replacement of any single battery. Each battery shall be equipped with carrying handles to facilitate ease of removal and replacement. There shall be two (2) steel frame mounted battery boxes, one (1) on the left frame rail and one (1) on the right frame rail. Each battery box shall be secured to the frame rail with Grade 8 hardware. Each battery box shall hold (2) batteries. The batteries shall have a minimum combined rating of 4,000 (4 x 1000) cold cranking amps (CCA) @ 0 degrees Fahrenheit and 820 (4 x 205) minutes of reserve capacity for extended

operation. The batteries shall have 3/8-16 threaded stud terminals to ensure tight cable connections. The battery stud terminals shall each be treated with concentrated industrial soft-seal after cable installation to promote corrosion prevention. The positive and negative battery stud terminals and the respective cables shall be clearly marked to ensure quick and mistake-proof identification.

Batteries shall be placed on non-corrosive rubber matting and secured with hold-down brackets to prevent movement, vibration, and road shock. The hold-down bracket J-hooks shall be cut to fit and shall have all sharp edges removed. The batteries shall be placed in plastic trays to provide preliminary containment should there be leakage of hazardous battery fluids. There shall be two (2) plastic trays, each containing (2) batteries. Each battery tray shall be equipped with a rubber vent hose to facilitate drainage. The rubber vent hose shall be routed to drain beneath the battery box. The batteries shall be positioned in well-ventilated areas.

One (1) positive and one (1) negative jumper stud shall be provided.

Batteries shall have a warranty of twelve (12) months that shall commence upon the date of delivery of the apparatus.

Engine Fan Clutch

The engine shall be equipped with a thermostatically controlled engine cooling fan. The fan shall be belt driven and utilize a clutch to engage when the engine reaches a specified temperature and / or the water pump is engaged (if equipped).

When disengaged, the fan clutch shall allow for improved performance from optional floor heaters, reduced cab interior noise, increased acceleration and improved fuel economy.

The fan shall be equipped with a fail-safe engagement so that if the clutch fails the fan shall engage to prevent engine overheating.

Drivelines

Drivelines shall have a heavy duty metal tube and shall be equipped with Spicer 1810 series universal joints to allow full-transmitted torque to the axle(s). Drive shafts shall be axially straight, concentric with axis and dynamically balanced.

Front Tow Eyes

Two (2) 3/4" thick heavy duty steel tow eyes shall be securely attached to the chassis frame rails at the front of the apparatus. They shall be mounted down below the bumper / cab.

Rear Tow Eyes

Two (2) heavy duty tow eyes made of 3/4" (0.75") thick steel having 2-1/2" diameter holes shall be mounted below the body at the rear of the vehicle to allow towing (not lifting) of the apparatus without damage. The tow eyes will be welded to the lower end of a 5" steel channel that is bolted at the end of the chassis frame rails. The tow eyes shall be painted chassis black.

DEF Tank

A diesel exhaust fluid (DEF) tank with a five (5) gallon capacity shall be provided.

The DEF tank shall include a heater fed by hot water directly from the engine block to prevent the DEF from becoming too cool to operate correctly per EPA requirements. The tank shall include a temperature sensor to control the heater control valve that controls the feed of hot water from the engine to the DEF tank heater.

A sender shall be provided in the DEF tank connected to a level gauge on the cab dash.

The tank shall be located left side below rear of cab.

Power Steering Cooler

A heat exchanger (cooler) shall be installed to maintain desired power steering fluid temperature. The cooler shall be a model DH-073-1-1 with air / oil design rated at 6300 BTU/HR @10 GPM. The cooler shall be mounted in front of the radiator and plumbed with #10 lines.

Cab

E-One Cyclone II 58" level roof cab shall be used.

Cab with Barrier Style Doors

The vehicle shall be distinguished by an all-welded aluminum and fully enclosed tilt cab. The cab shall be designed exclusively for fire/rescue service and shall be pre-engineered to ensure long life. It shall incorporate an integral welded substructure of high-strength aluminum alloy extrusions that creates an occupant compartment that is essentially a protective perimeter. The end result is a distinctive structure that is aesthetically appealing, functionally durable, and characterized by increased personnel safety.

The cab shall be constructed from 3/16" (0.188") 3003 H14 aluminum alloy plate roof, floor, and outer skins welded to a high-strength 6063-T6 aluminum alloy extruded subframe. Wall supports and roof bows are 6061 T6 aluminum alloy. This combination of a high-strength, welded aluminum inner structure surrounded on all

sides by load-bearing, welded aluminum outer skins provides a cab that is strong, lightweight, corrosion-resistant, and durable.

The inner structure shall be designed to create an interlocking internal "roll-cage" effect by welding two (2) 3" x 3" x 0.188" wall-thickness 6063-T5 aluminum upright extrusions between the 3" x 3" x 0.375" wall-thickness 6061-T6 roof crossbeam and the 2.25" x 3" x 0.375" wall-thickness 6063-T6 subframe structure in the front. An additional two (2) aluminum upright extrusions within the back-of-cab structure shall be welded between the rear roof perimeter extrusion and the subframe structure in the rear to complete the interlocking framework. The four (4) upright extrusions -- two (2) in the front and two (2) in the rear -- shall be designed to effectively transmit roof loads downward into the subframe structure to help protect the occupant compartment from crushing in a serious accident. All joints shall be electrically seam welded internally using aluminum alloy welding wire.

The subframe structure shall be constructed from high-strength 6061-T6 aluminum extrusions welded together to provide a structural base for the cab. It shall include a side-to-side C-channel extrusion across the front, with 3/4" x 2-3/4" (.75" x 2.75") full-width crossmember tubes spaced at critical points between the front and rear of the cab.

The cab floor shall be constructed from 3/16" (0.188") 3003 H14 smooth aluminum plate welded to the subframe structure to give the cab additional strength and to help protect the occupants from penetration by road debris and under-ride collision impacts.

The cab roof shall be constructed from 3/16" (0.188") 3003 H14 aluminum treadplate supported by a grid of fore-aft and side-to-side aluminum extrusions to help protect the occupants from penetration by falling debris and downward-projecting objects. Molded fiberglass or other molded fiber-reinforced plastic roof materials are not acceptable.

The cab roof perimeter shall be constructed from 4" x 6-5/8" (4" x 6.625") 6063-T5 aluminum extrusions with integral drip rails. Cast aluminum corner joints shall be welded to the aluminum roof perimeter extrusions to ensure structural integrity. The roof perimeter shall be continuously welded to the cab roof plate to ensure a leak-free roof structure.

The cab rear skin shall be constructed from 3/16" (0.188") 3003 H14 aluminum plate. Structural extrusions shall be used to reinforce the rear wall.

The left-hand and right-hand cab side skins shall be constructed from 3/16" (0.188") 3003 H14 smooth aluminum plate. The skins shall be welded to structural aluminum extrusions at the top, bottom, and sides for additional reinforcement.

The cab front skins shall be constructed from 3/16" (0.188") 3003 H14 smooth aluminum plate. The upper portion shall form the windshield mask, and the lower portion shall form the cab front. Each front corner shall have a full 9" outer radius for strength and appearance. The left-hand and right-hand sides of the windshield mask shall be welded to the left-hand and right-hand front door frames, and the upper edge of the windshield mask shall be welded to the cab roof perimeter extrusion for reinforcement. The cab front shall be welded to the subframe C-channel extrusion below the line of the headlights to provide protection against frontal impact.

Cab Exterior

The exterior of the cab shall be 94" wide x 130" long to allow sufficient room in the occupant compartment for up to eight (8) fire fighters. The cab roof shall be approximately 101" above the ground with the flat roof option. The back-of-cab to front axle length shall be a minimum of 58".

Front axle fenderette trim shall be brushed aluminum for appearance and corrosion resistance. Bolt-in front wheel well liners shall be constructed of 3/16" (0.188") composite material to provide a maintenance-free, damage-resistant surface that helps protect the underside of the cab structure and components from stones and road debris.

A large stainless steel cooling air intake grille with an open area of no less than 81% shall be at the front of the cab.

The cab windshield shall be of a two-piece replaceable design for lowered cost of repair. The windshield shall be made from 1/4" (0.25") thick curved, laminated safety glass with a 75% light transmittance automotive tint. A combined minimum viewing area of 2,700-sq. in. shall be provided. Forward visibility to the ground for the average (50^{th} percentile) male sitting in the driver`s seat shall be no more than 11 feet 7 inches from the front of the cab to ensure good visibility in congested areas.

Cab Mounts and Cab Tilt System

The cab shall be independently mounted from the body and chassis to isolate the cab structure from stresses caused by chassis twisting and body movements. Mounting points shall consist of two (2) forward-pivoting points, one (1) on each side; two (2) intermediate rubber load-bearing cushions located midway along the length of the cab, one on each side; and two (2) combination rubber shock mounts and cab latches located at the rear of the cab, one (1) on each side.

An electric-over-hydraulic cab tilt system shall be provided to provide easy access to the engine. It shall consist of two (2) large-diameter, telescoping, hydraulic lift cylinders, one (1) on each side of the cab, with a frame-mounted electric-over-hydraulic pump for cylinder actuation.

Safety flow fuses (velocity fuses) shall be provided in the hydraulic lift cylinders to prevent the raised cab from suddenly dropping in case of a burst hydraulic hose or other hydraulic failure. The safety flow fuses shall operate when the cab is in any position, not just the fully raised position.

The hydraulic pump shall have a manual override system as a backup in the event of an electrical failure. Lift controls shall be located in a compartment to the rear of the cab on the right side of the apparatus. A parking brake interlock shall be provided as a safety feature to prevent the cab from being tilted unless the parking break is set.

The entire cab shall be tilted through a 42-45 degree arc to allow for easy maintenance of the engine, transmission and engine components. A positive-engagement safety latch shall be provided to lock the cab in the full tilt position to provide additional safety for personnel working under the raised cab.

In the lowered position, the cab shall be locked down by two (2) automatic, spring-loaded cab latches at the rear of the cab. A "cab ajar" indicator light shall be provided on the instrument panel to warn the driver when the cab is not completely locked into the lowered position.

Cab Interior

The interior of the cab shall be of the open design with an ergonomically-designed driver area that provides ready access to all controls as well as a clear view of critical instrumentation.

The engine cover between the driver and the officer shall be a low-rise contoured design to provide sufficient seating and elbow room for the driver and the officer. The engine cover shall blend in smoothly with the interior dash and flooring of the cab. An all-aluminum subframe shall be provided for the engine cover for strength. The overall height of the engine enclosure shall not exceed 23" from the floor at each side and 27" in the center section. The engine cover shall not exceed 41" in width at its widest point.

The rear portion of the engine cover shall be provided with a lift-up section to provide easy access for checking transmission fluid, power steering fluid, and engine oil without raising the cab. The engine cover insulation shall consist of 3/4" dual density fiberglass composite panels with foil backing manufactured to specifically fit the engine cover without modification to eliminate "sagging" as found with foam insulation. The insulation shall meet or exceed DOT standard MVSS 302-1 and V-0 (UI subject 94 Test).

All cab floors shall be covered with a black rubber floor mat that provides an aggressive slip-resistant surface in accordance with current NFPA 1901.

A minimum of 57.25" of floor-to-ceiling height shall be provided in the front seating area of the cab and a minimum of 55.25" floor-to-ceiling height shall be provided in the rear seating area. A minimum of 36" of seated headroom at the "H" point shall be provided over each fenderwell.

The floor area in front of the front seat pedestals shall be no less than 20.5" side to side by 25.0" front to rear for the driver and no less than 20.5" side to side by 26.0" front to rear for the officer to provide adequate legroom.

Battery jumper studs shall be provided to allow jump-starting of the apparatus without having to tilt the cab.

All exposed interior metal surfaces shall be pretreated using a corrosion prevention system.

The interior of the cab shall be insulated to ensure the sound (dbA) level for the cab interior is within the limits stated in the current edition of NFPA 1901. The insulation shall consist of 2 oz. wadding and 1/4" (0.25") foam padding. The padding board shall be backed with 1/4" (0.25") thick reflective insulation. The backing shall be spun-woven polyester. Interior cab padding shall consist of a rear cab headliner, a rear wall panel, and side panels between the front and rear cab doors.

The overhead console and heater cover shall be covered with thermoformed, non-metallic, non-fiber trim pieces to provide excellent scuff and abrasion resistance, as well as chemical stain resistance. The thermoformed material shall comply with Federal Motor Vehicle Safety Standard (FMVSS) 302 for flammability of interior materials.

The vehicle shall use a seven-position tilt and telescopic steering column to accommodate various size operators. An 18" padded steering wheel with a center horn button shall be provided.

A full-width overhead console shall be mounted to the cab ceiling for placement of siren and radio heads, and for warning light switches. The console shall be made from a thermoformed, non-metallic material and shall have easily removable mounting plates.

Storage areas, with hinged access doors, shall be provided below the driver and officer seats. The driver side compartment shall be approximately 19.25" x 17.75" x 5.75" high and the officer side compartment shall be approximately 18.25" x 22.5" x 11" high (19.25" x 17.75" x 5.75" w/ air ride).

The front cab steps shall be a minimum of 8" deep x 24" wide. The first step shall be no more than 24.0" above the ground with standard tires in the unloaded condition per NFPA 1901 standards. The rear cab steps shall be a minimum 12" deep x 21"

wide. The first step shall be no more than 24.0" above the ground with standard tires in the unloaded condition per NFPA 1901 standards. The rear steps shall incorporate intermediate steps for easy access to the cab. The step surfaces shall be aluminum diamond plate with a multi-directional, aggressive gripping surface incorporated into the aluminum diamond plate in accordance with current NFPA 1901.

A black rubber grip handle shall be provided on the interior of each front door below the door window to ensure proper hand holds while entering and exiting the cab. An additional black rubber grip handle shall be provided on the left and right side windshield post for additional handholds.

Cab Doors

There shall be reflective signs on each cab door in compliance with all NFPA requirements.

Four (4) side-opening cab doors shall be provided. Doors shall be constructed of a 3/16" (0.188") aluminum plate outer material with an aluminum extruded inner framework to provide a structure that is as strong as the side skins.

Front cab door openings shall be approximately 36" wide x 63" high, and the rear cab door openings shall be approximately 33.75" wide x 63" high. The front doors shall open approximately 75 degrees, and the rear doors shall open approximately 80 degrees.

The doors shall be securely fastened to the doorframes with full-length, stainless steel piano hinges, with 3/8" (0.375") diameter pins for proper door alignment, long life, and corrosion resistance. Mounting hardware shall be treated with corrosion-resistant material prior to installation. For effective sealing, an extruded rubber gasket shall be provided around the entire perimeter of all doors.

Stainless steel paddle-style door latches shall be provided on the interiors of the doors. The latches shall be designed and installed to protect against accidental or inadvertent opening as required by NFPA 1901.

The front door windows shall provide a minimum viewing area of 530 sq. in. each. The rear door windows shall provide a minimum viewing area of 500 sq. in. each. All windows shall have 75% light transmittance automotive safety tint. Full roll-down windows shall be provided for the front cab doors with worm gear drive cable operation for positive operation and long life. Scissors or gear-and-sector drives are not acceptable. Rear cab doors shall be provided with full roll down windows except when used with paddle style external door latches.

Cab Instruments and Controls

Two (2) pantograph-style windshield wipers with two (2) separate electric motors shall be provided for positive operation. Air-operated windshield wipers are not acceptable because of their tendency to accumulate moisture, which can lead to corrosion or to freezing in cold weather. The wipers shall be a wet-arm type with a one (1) gallon washer fluid reservoir, an intermittent-wipe function, and an integral wash circuit. Wiper arm length shall be approximately 28", and the blade length approximately 20". Each arm shall have a 70 degree sweep for full coverage of the windshield.

An overhead mounted heater and defroster with a minimum capacity of 60,000 Btu/hr and all necessary controls shall be mounted in the cab. The airflow system shall consist of two (2) levels, defrost and cab, and shall have fresh air and defogging capabilities.

Cab controls shall be located on the cab instrument panel in the dashboard on the driver`s side where they are clearly visible and easily reachable. Emergency warning light switches shall be installed in removable panels for ease of service. The following gauges and/or controls shall be provided:

• Master battery switch/ignition switch (rocker with integral indicator)
• Starter switch/engine stop switch (rocker)
• Heater and defroster controls with illumination
• Marker light/headlight control switch with dimmer switch
• Self-canceling turn signal control with indicators
• Windshield wiper switch with intermittent control and washer control
• Master warning light switch
• Transmission oil temperature gauge
• Air filter restriction indicator
• Pump shift control with green "pump in gear" and "o.k. to pump" indicator lights
• Parking brake controls with red indicator light on dash
• Automatic transmission shift console
• Electric horn button at center of steering wheel
• Cab ajar warning light on the message center enunciator

Controls and switches shall be identified as to their function by backlit wording adjacent to each switch, or indirect panel lighting adjacent to the controls.

Fast Idle System

A fast idle system shall be provided and controlled by the cab-mounted switch. The system shall increase engine idle speed to a preset RPM for increased alternator output.

RADIO ANTENNA MOUNT

There shall be three (2) standard 1.125", 18 thread antenna-mounting base(s) installed on the cab roof, aft of the lightbar, evenly spaced across the roof for high efficiency, low loss, shielded coaxial cable(s) routed to the radio mounting area. A weatherproof cap shall be installed on the mount.

Radio Mounting Location

There shall be a mounting spot for (2) DIN size radios in the dash easily reachable by the driver and passenger. They shall have a minimum clearance depth of 10" for each. The radio antenna cables should terminate in this location. Also there shall be (2) 50 amp 10 gauge red power wire hard wired to constant clean 12v power source. There shall also be (2) 5 amp 14 gauge power wires connected to the ignition power in this location. And then (2) 10 gauge black chassis ground wires at this location.

Electrical System

The cab and chassis system shall have a centrally located electrical distribution area. All electrical components shall be located such that standard operations shall not interfere with or disrupt vehicle operation. An automatic thermal-reset master circuit breaker compatible with the alternator size shall be provided. Automatic-reset circuit breakers shall be used for directional lights, cab heater, battery power, ignition, and other circuits. An access cover shall be provided for maintenance access to the electrical distribution area.

A 6 place, constantly hot, and 6 place ignition switched fuse panel and ground for customer-installed radios and chargers shall be provided at the electrical distribution area. Radio suppression shall be sufficient to allow radio equipment operation without interference.

All wiring shall be mounted in the chassis frame and protected from impact, abrasion, water, ice, and heat sources. The wiring shall be color-coded and functionally-labeled every 3" on the outer surface of the insulation for ease of identification and maintenance. The wiring harness shall conform to SAE 1127 with GXL temperature properties. Any wiring connections exposed to the outside environment shall be weather-resistant. All harnesses shall be covered in a loom that is rated at 280 degrees F to protect the wiring against heat and abrasion.

A Vehicle Data Computer (VDC) shall be supplied within the electrical system to process and distribute engine and transmission Electronic Control Module (ECM) information to chassis system gauges, the message center, and related pump panel gauges. Communication between the VDC and chassis system gauges shall be through a 4 wire multiplexed communication system to ensure accurate engine and

transmission data is provided at the cab dash and pump. The VDC shall be protected against corrosion, excessive heat, vibration, and physical damage.

Two (2) dual rectangular sealed beam halogen headlights shall be installed on the front of the cab, one (1) on each side, mounted in a polished chrome-plated bezel. The low beam headlights shall activate with the release of the parking brake to provide daytime running lights (DRL) for additional vehicle conspicuity and safety. The headlight switch shall automatically override the DRL for normal low beam/high beam operation.

Cab Crashworthiness Requirement

The apparatus cab shall meet and/or exceed relevant NFPA 1901 load and impact tests required for compliance certification with the following:

Side Impact Dynamic Pre-Load per SAE J2422 (Section 5).

Testing shall meet and/or exceed defined test using 13,000 ft-lbs of force as a requirement. The cab shall be subject to a side impact representing the force seen in a roll-over. The cab shall exhibit minimal to no intrusion into the cab's occupant survival space, doors shall remain closed and cab shall remain attached to frame.

Cab testing shall be completed using 13,776 ft-lbs of force **exceeding** testing requirements.

Quasi-static Roof Strength (proof loads) per SAE J2422 (Section 6) / ECE R29, Annex 3, paragraph 5.

Testing shall meet and/or exceed defined test using 22,046 lbs of mass as a requirement. Testing shall be completed using platen(s) distributed uniformly over all bearing members of the cab roof structure.

Cab testing shall be completed using 23,561 lbs of mass **exceeding** testing requirements. The cab shall exhibit minimal to no intrusion into the cab's occupant survival space and doors shall remain closed.

Additional cab testing shall be conducted using 117,336 lbs of mass **exceeding** testing requirements by **over five (5) times**. The cab shall exhibit minimal to no intrusion into the cab's occupant survival space and the doors shall remain closed.

Frontal Impact per SAE J2420.

Testing shall meet and/or exceed defined test using 32,549 ft-lbs of force as a requirement. The cab shall be subject to a frontal impact as defined by the standard. The cab shall exhibit minimal to no intrusion into the cab's occupant survival space, doors shall remain closed and cab shall remain attached to frame.

Cab testing shall be completed using 34,844 ft-lbs of force **exceeding** testing requirements.

Additional cab testing shall be conducted using 65,891 ft-lbs of force **exceeding** testing requirements by **over two (2) times**.

A copy of a certificate or letter verifying compliance to the above performance by an independent, licensed, professional engineer shall be provided upon request.

For any or all of the above tests, the cab manufacturer shall provide either photographs or video footage of the procedure upon request.

Rear Cab Door Position

The cab rear doors shall be moved to the rear of the wheel opening. This door placement facilitates easier entry and egress by reducing the rear facing seat protrusion into the door opening.

Rear door position to the 58" or (medium cab).

Cab Front Door Windows

Driver and officer door windows shall have the support pillar located toward the rear of the window to improve visibility of mirrors. There shall be no vent within the window itself.

Cab Door Locks

Each cab door shall have a manual operated door lock actuated from the interior of each respective door. Exterior of each cab door shall be provided with a barrel style keyed lock below the cab door handle.

Cab Door Locks

The cab shall have 1250 keyed door locks provided on exterior doors to secure the apparatus.

Cab Door Front Windows

Driver and Officer door windows. Includes electric roll-down actuation. Each door to have individual control at door position and the driver door is to have master control for all power window locations.

Cab Door Rear Windows

Rear crew cab door windows. Includes electric roll-down actuation. Each door to have individual control. Not available with paddle style door latching.

Cab Door Panels

The inner door panels shall be made from 14 gauge brushed finish stainless steel for increased durability. The cab door panels shall incorporate an easily removable panel for access to the latching mechanism for maintenance or service.

Cab Door Exterior Latches

All cab doors shall have ”L” style exterior door latches.

Cab Step Area Lighting

There shall be four (4) clear incandescent lights provided to illuminate the cab step well area. Each light shall be located in the cab step well area. Each light shall be activated by the cab door ajar circuit.

Cab Door Reflective Material

Reflective Red/Fluorescent Yellow Green 3M Diamond Grade material striping shall be supplied on each of the cab doors. The stripes shall run from the lower outer corner to the upper inside corner of the panel, forming an "A" shape when viewed from the rear. The material shall meet NFPA 1901 requirements for size (96 square inches) and reflectivity.

Cab Steps

A step below the cab door shall be provided. The step shall be constructed of .188” aluminum tread brite. The step surface shall be provided with an aggressive skid-resistant surface. The step shall be in accordance with current NFPA requirements and shall include a multi-directional aggressive gripping surface incorporated into the diamond plate. The surface shall extend vertically from the diamond plate sheet a minimum of 1/8" (0.125"). Gripping surfaces shall be circular in design, a minimum of 1" diameter and on centers not to exceed 4". It shall be located driver's front door, officer's front door, driver's rear door, officer's rear door. Steps under front cab doors shall not interfere with approach angle.

Cab Mirrors

There shall be two (2) Lang Mekra 300 Aero Series Technology Mirrors provided, one (1) driver`s and one (1) officer`s side. The mirrors shall be chrome-plated or black on the main head, be remote controlled with a four way power system and be heated. There shall be LED marker lights with bezel on the main head, and LED

arrow lights in the mirror glass. The main flat glass shall provide 120 square inches of viewable surface space.

There shall be separate heads for the driver`s and officer`s side housing convex glass and provide 56 square inches of viewing surface.

The mirrors shall be mounted on the cab doors.

Cab Windows Rear Wall

Fixed glass windows shall be supplied on either side of the cab, providing visibility at the rear. The windows shall be approximately 4" wide and approximately the same height as the door windows.

Cab Canopy Windows

There shall be a fixed window provided between the front and rear doors on the driver and officer`s side of the cab.

Window dimensions shall be 26.69"W x 24.5"H

Front Mudflaps

Black linear low density polyethylene (proprietary blend) mudflaps shall be installed on the rear of the cab front wheel wells. The design of the mudflaps shall have corrugated ridges to distribute water evenly.

Handrails

Cab door assist handrails shall consist of two (2) 1.25" diameter x 18" long 6063-T5 anodized aluminum tubes mounted directly behind the driver and officer door openings one each side of the cab. The handrails shall be machine extruded with integral ribbed surfaces to assure a good grip for personnel safety. Handrails shall be installed between chrome end stanchions and shall be positioned at least 2" from the mounting surface to allow a positive grip with a gloved hand.

Handrails

Cab door assist handrails shall consist of two (2) 1.25" diameter x 18" long 6063-T5 anodized aluminum tubes mounted directly behind the driver and officer rear door openings each side of the cab. The handrails shall be machine extruded with integral ribbed surfaces to assure a good grip for personnel safety. Handrails shall be installed between chrome end stanchions and shall be positioned at least 2" from the mounting surface to allow a positive grip with a gloved hand.

Rear Cab Wall Construction

The rear cab wall shall be constructed with the use of 3/16" aluminum diamond plate interlocking in aluminum extrusions.

Cab Wheel Well

The cab wheel well shall be increased in size to provide additional clearance for larger tires and tire chains. The fender trim shall be adjustable in and out to better accommodate various wheel / tire offsets.

Receptacle Mounting Plate

A mounting plate shall be provided for the battery charger receptacle, battery charger indicator and if applicable the air inlet. The plate shall be constructed of 14 gauge brushed finish stainless steel and be removable for service access to the receptacle(s) and indicator.

Air Conditioning

An overhead air-conditioner / heater system with a single roof mounted condenser shall be supplied.

The unit shall be mounted to the cab interior headliner in a mid cab position, away from all seating positions. The unit shall provide ten (10) comfort discharge louvers, four (4) to the back area of the cab and six (6) to the front. These louvers will be used for AC and heat air delivery. Two (2) additional large front louvers shall be damper controlled to provide defogging and defrosting capabilities to the front windshield as necessary.

The unit shall consist of a high output evaporator coil and heater core with one (1) high output dual blower for front air delivery, and two (2) high performance single wheel blowers for rear air delivery.

A serviceable filter shall be installed on the A/C evaporator. The filter shall consist of a steel perimeter frame with a foam filter.

The control panel shall actuate the air-distribution system with air cylinders, which are to be separated from the brake system by an 85-90 psi pressure protection valve. A three-speed blower switch shall control air speed.

The condenser shall be roof mounted and have a minimum capacity of 65,000 BTU`s and have dual fans with a built in receiver drier.

Performance Data: (Unit only, no ducting or louvers)

AC BTU: 55,000

Heat BTU: 65,000

CFM : 1300 @ 13.8V (All blowers)

The compressor shall be a ten-cylinder swash plate type Seltec model TM-31HD with a capacity of 19.1 cu.in. per revolution.

The system shall be capable of cooling the interior of the cab from 100 degrees ambient to 75 degrees or less with 50% relative humidity in 30 minutes or less.

Supplemental Cab Heat

A single 40,000 BTU water heater shall be supplied in the front area of the cab. The unit shall heat the lower section of the driver`s and officer`s footwell.

Dual 23,000 BTU water heaters with diamond plate covers shall be supplied in the rear of the cab to heat the rear cab lower section.

Dual climate control will be achieved via dual switches installed on a front instrument panel. On units with optional multiplex display climate control, the floor heaters shall be controlled through the HVAC screen in the display.

HVAC Control Location

Heating and air conditioning controls shall be located in the driver side lower dash area.

Cab Seats

All cab seats shall be black Bostrom brand.

One (1) H. O. Bostrom 400 Series Sierra Air- 100RX4 suspension seats with high back styling shall be supplied for the driver position.

Features shall include:

- Air-100 suspension assembly with weight, height and ride adjustment.
- Built in lumbar support.
- 4" vertical suspension motion.
- 5" fore and aft adjustment.

One (1) H. O. Bostrom 400 Series fixed seat with high back SCBA storage for the officer`s position shall be supplied.

Features shall include:

• Removable ”Store-All” side cushions.
• Auto-pivot and return headrest to open for improved exit with SCBA.
• 12.5” wide SCBA cavity to store leading SCBA Brands.
• Built in lumbar support.
• Replaceable seat, side and headrest cushions.

One (1) Bostrom 400 Series tanker 450 SCBA high back SCBA storage seat shall be provided in the rear facing position over the driver side wheel well.

Features shall include:

• Removable ”Store-All” side cushions.
• Auto-pivot and return headrest to open for improved exit with SCBA.
• 12.5” wide SCBA cavity to store leading SCBA Brands.
• Built in lumbar support.
• Replaceable seat, side and headrest cushions.

One (1) Bostrom 400 Series tanker 450 SCBA high back SCBA storage seats shall be provided in the rear facing position over the officer side wheel well.

Features shall include:

• Removable ”Store-All” side cushions.
• Auto-pivot and return headrest to open for improved exit with SCBA.
• 12.5” wide SCBA cavity to store leading SCBA Brands.
• Built in lumbar support.
• Replaceable seat, side and headrest cushions.

Two (2) fold down seats with Bostrom Res-Q-Back seat back with SCBA storage. Location on the rear wall to be driver's side inboard, officer's side inboard.

Features shall include:

• Seat bottom constructed of high density foam with a heavy wear resistant covering
• Automatically fold up when not in use to provide increased room in the rear of the cab.
• Removable ”Store-All” side cushions.
• Auto-pivot and return headrest to open for improved exit with SCBA.
• 12.5” wide SCBA cavity to store leading SCBA Brands.
• Built in lumbar support.
• Replaceable seat, side and headrest cushions.

All seat positions shall have a bright red retractable 3-point lap and shoulder harness, providing additional safety and security for personnel. Extensions shall be provided with the seat belts so the male end can be easily grasped and the female end easily located while sitting in a normal position.

Seating Capacity Tag

A tag that is in view of the driver stating seating capacity of six (6) personnel shall be provided.

Mechanical Air Pack Bottle Bracket

Ziamatic model QM-EZL mechanical SCBA bottle bracket(s) shall be provided to fit most SCBA bottles currently on the market. The bracket(s) shall be positive locking and be equipped with an adjustable top clamp, adjustable footplate and center pull release for Bostrom seat.

The SCBA bracket(s) shall be equipped with a PVC coated flip-down restraint to securely lock the SCBA in place without damaging the cylinder wall.

The bracket(s) shall be located officer's seat, rear facing driver's side, inboard driver's side rear wall, inboard officer's side rear wall, rear facing officer's side.

Cab Interior Color

Cab instrument panel, overhead console, trim panels, headliner, and door panels shall be black.

Sun Visors

Padded sun visors shall be provided for the driver and officer matching the interior trim of the cab and shall be flush mounted into the underside of the overhead console.

Air Horn Lanyard

There shall be a ”Y” style lanyard mounted in the center of the cab that allows the driver and officer to operate the air horns. The lanyard shall activate an electrical air switch.

Cab Dash

All surfaces subject to repeated contact and wear -- the center and officer side dash, windshield "A" post covers and lower front kick panels -- shall be covered with thermoformed, non-metallic, non-fiber trim pieces to provide excellent scuff and abrasion resistance, as well as chemical stain resistance. The thermoformed material shall comply with Federal Motor Vehicle Safety Standard (FMVSS) 302 for flammability of interior materials.

Rear Engine Cover Trim

The rear portion of the engine cover shall have an overlay of aluminum diamond plate installed to provide additional wear resistance.

Engine Cover

The engine cover shall blend in smoothly with the interior dash and flooring of the cab. The upper left and right sides shall have a sloped transition surface running front to rear providing increased space for the driver and officer.

The engine cover and engine service access door cover shall be molded 18 lb/cu. ft. (+/-0.5) flexible integral skinned polyurethane foam at a Durometer of 60 (+/- 5.0) per ASTM F1957-99 and with a minimum skin thickness of 0.0625 inches and shall be provided to reduce the transmission noise and heat from the engine. The cover shall be black and feature a pebble grain finish for slip resistance.

Rear Wall Toolboard

Pac Trac tool mounting shall be provided on the rear wall of the cab. The Pac Trac shall be vertically stacked outboard of fold down seats full height of the rear cab wall.

Cab Dome Lights

A Weldon LED dome light assembly with one (1) white lens and one (1) red lens and plastic housing shall be installed. The white light activates with appropriate cab door and light assembly switch, the red light activates with light assembly mounted switch only.

There shall be two (2) mounted in the front of the cab, one (1) in the driver and one (1) in the officer ceiling.

There shall be two (2) mounted in the rear of the cab, one (1) in the driver side and one (1) in the officer side ceiling.

Radio

The unit shall be equipped with an AC Delco model XTA2300 AM/FM stereo CD with weather band. Two (2) 5-1/4" radio speakers and antenna shall be supplied mounted in padding adjacent to driver and officer seats.

Unit shall be suppressed from engine noise to provide clear sound through respective speakers.

Location: center overhead console offset to driver side.

Auto-Eject Battery Charger Receptacle

The battery charger receptacle shall be a Kussmaul 20 amp NEMA 5-20 Super Auto-Eject #091-55-20-120 with a cover. The Super Auto-Eject receptacle shall be completely sealed and have an automatic power line disconnect.

The receptacle shall be located outside driver's door next to handrail and the cover color shall be Yellow.

Horn Button Switch

A two (2) position rocker switch shall be installed in the cab accessible to driver and properly labeled to enable operator to activate the OEM traffic horn or electronic siren from the steering wheel horn button.

ATC Override

An Automatic Traction Control (ATC) override switch shall be provided. The switch shall be located within reach of the driver and allow for momentary disabling of the ATC system due to mud or snow conditions.

DPF Regeneration Override

An override switch shall be provided for the Diesel Particulate Filter (DPF) regeneration. The switch will inhibit the regeneration process until the switch is reset or the engine is shut down and restarted. The switch shall be located within reach of the driver.

English Dominant Gauge Cluster

The cab operational instruments shall be located in the dashboard on the driver side of the cab and shall be clearly visible. The gauges in this panel shall be English dominant and shall be the following:

- Speedometer/Odometer
- Tachometer with integral hour meter
- Engine oil pressure gauge with warning light and buzzer
- Engine water temperature gauge with warning light and buzzer
- Two (2) air pressure gauges with a warning light and buzzer (front air and rear air)
- Fuel gauge
- Voltmeter
- Transmission oil temperature gauge

This panel shall be backlit for increased visibility during day and night time operations.

Headlights

The front of the cab shall have four (4) headlights. The headlights shall be mounted on the front of the cab in the lower position. The headlights shall be day time operational.

Cab 12 Volt Outlets

A plug-in type receptacle for hand held spotlights, cell phones, chargers, etc. shall be installed in cab driver side on 3 x 3 post rear facing just above engine cover, cab officer side on 3 x 3 post rear facing just above engine cover. The receptacle shall be wired battery hot.

Battery Charger Location

The battery charger shall be located behind driver's seat.

Cab Turn Signals

There shall be a pair of Whelen M6 LED (Light Emitting Diode) turn signal light heads with populated arrow pattern and amber lens mounted upper headlight bezel and wired with weatherproof connectors.

Battery Charger

An LPC 20 battery charger with remote mounted LED display shall be installed.

A fully automatic charging system shall be installed on the apparatus. The system shall have a 120 volt, 60 hertz, 7 amp AC input with an output of 20 amps 12 volts DC. The battery charging system shall be connected directly to the shoreline to ensure the batteries remain fully charged while the vehicle is in the fire station or firehouse.

The system shall include a remote charging status indicator panel. The panel shall consist of two (2) LED lights to provide a visual signal if battery voltage is good or drops below 11.5 volts. The microprocessor shall be continuously powered from the battery to provide the charge status.

Cab Headlights

The quad cab headlight bezels shall contain rectangular sealed beam halogen lights.

Stainless Steel Body Design and Construction

The compartment floors, ceilings, front panels, vertical side sheets, rear walls, door openings, wheel wells, compartment panels, dividing walls, and reinforcements shall be constructed of 12 gauge 304L stainless steel material. The interior of the

compartments shall be provided with a machine sanded DA finish. The exterior of the body shall be prepared for job color paint finish.

To eliminate unnecessary seams and overlapping areas, the construction of all component panels shall feature break-formed fabrication. Angle iron framing is not acceptable. Component panels shall be in single metal sections wherever possible.

The assembly of body component panels shall be with inert gas, continuous feed welders. Stick welding is not acceptable. The use of sheet metal fasteners in assembly of body components is unacceptable.

Structural supports shall be incorporated into the overall design to provide the necessary support for component panels and body modules.

The body shall be a free standing module supported only by the top of the frame rails using a transverse 3/16" thick 304L stainless steel structure assembly. This structure shall be secured in a minimum of four (4) locations, using a double flex mount system and angle brackets bolted to both the body structural assembly and the sides of the chassis frame rails using Grade 8 fasteners. Mylar shall be used to isolate the structural assembly from the frame rails. A body substructure using carbon steel, outrigger arms or any other mounting method is not acceptable. This design is required to eliminate shift and stress on the body module and component panels.

The water tank shall be mounted on a 304L stainless steel tubular structure at the base of the tank, and stainless steel channels spanning the width of the hosebed across the top of the tank. Hold downs shall allow for chassis flex front and rear on the tank, without transmitting stress into the water tank. Isolating materials of hard rubber strips shall be installed at all contact points between the base of the tank and the tank mounting structure.

Each compartment door opening shall have at least a double break-formed door jamb for recessed door seal inboard of the exterior of the body. The break-formed door jamb is required for superior strength and body construction integrity. Doors that seal only at the exterior surface of the body or utilize only a single break-formed door jamb are not acceptable.

The compartment floor construction shall permit easy cleaning with a true sweep-out design. The outer floor area, making up the compartment door jamb,
shall incorporate a triple break-formed construction for recessed door seal inboard of the exterior of the body. This shall be required to eliminate road splash and debris from entering the compartments at floor level. Angles, lips, or door moldings are not acceptable in the base of the door opening. There shall be a minimum of two (2) 3/8" drain holes in the compartment floors.

Driver Side Compartments

Compartment L1, ahead of the rear wheels, shall be 40" wide x 46" high x 27" deep in the lower section and 14" deep in the upper section.

Compartment L2, above the rear wheels, shall be 54" wide x 16" high x 14" deep.

Compartment L3, behind the rear wheels, shall be 48" wide x 46" high x 27" deep in the lower section and 14" deep in the upper section.

Each interior compartment seam shall be sealed with a silver silicone caulk. The rear walls of each compartment shall be provided with a bright stainless steel louvered vent.

An externally mounted compartment top shall be provided and constructed of 1/8" polished aluminum treadplate.

Ladder Rack

A Zico QUIC-LIFT Ladder Access System (LAS-HA-EL) ladder rack shall be provided over the officer side compartment top. The rack shall lower ladders approximately 31" from the stored position to provide a safe and convenient height for unloading and loading.

The rack shall be hydraulically operated and controlled by a 30 amp two-pole double-throw momentary switch located on the officer side pump panel. The control switch location shall allow the operator to monitor operations and ground personnel while lowering and raising the rack. The ladder rack shall be self-locking in any position during operation.

An audio alarm shall be provided to signal when the ladder rack is in motion. The rack shall be wired to the door ajar indicator light in the cab and shall be interlocked with the parking brake per NFPA.

The ladder rack shall have a maximum weight capacity of (300) three hundred pounds.

Officer Side Compartments

Compartment R1, ahead of the rear wheels, shall be 48" wide x 46" high x 27" deep in the lower section and 14" deep in the upper section.

Compartment R2, above the rear wheels, shall be 54" wide x 16" high x 14" deep.

Compartment R3, behind the rear wheels, shall be 40" wide x 46" high x 27" deep in the lower section and 14" deep in the upper section.

Each interior compartment seam shall be sealed with a silver silicone caulk. The rear walls of each compartment shall be provided with a bright stainless steel louvered vent.

An externally mounted compartment top shall be provided and constructed of 1/8" polished aluminum treadplate.

Rear Panel Area

The entire rear panel of the body shall be covered using smooth aluminum panels for application of the Chevron graphics.

A 12" deep rear tailboard of 3/16" aluminum treadplate shall be provided full width of the body. The standing surface of the tailboard shall be provided with a Bustin Tread welded insert.

Vertical grab rails shall be provided one each side on the vertical squared off rear beavertails of the body, and a horizontal grab rail shall be provided below the hosebed.

Rear Panel Compartment

Compartment B1, located centered ahead of the rear tailboard, shall be 46" wide x 45" high x 26" deep. Solid wall dividers shall be provided on both sides of the rear compartment. This compartment shall be of 12 gauge 304L stainless steel.

An 8" deep x 46" wide non-skid aluminum treadplate step with mitered corners shall be installed above the rear panel compartment for ease of access to the upper body area.

HYDRAULIC HOSE REEL (In rear compartment)

Two (2) Hannay Model EF2220-17-18 electric rewind reel shall be provided. The hose reel shall be designed to allow operation of a hydraulic tool away from the power unit and rescue vehicle. The reel shall have an oven-cured enamel finish, graphite shade silver in color. The reel drum and frame shall be constructed of heavy gauge steel. Bearings shall be self-aligning. The hose reel shall be powered by a 12 volt DC electric motor with a chain and sprocket drive for efficient deployment. The reel shall be equipped with push-button control #90030 in a position where the operator can safely observe the rewinding operation.

The reel shall be equipped with 4-way "C" Rollers, and a HS-35 hose stop.

HYDRAULIC RESCUE HOSE (In rear compartment)

The reel(s) shall be equipped with (100) feet of Hurst hydraulic hose to supply pressurized fluid to a tool and return fluid back to the power unit reservoir. The lines shall be constructed of thermoplastic with a Kevlar reinforcement and have a maximum working pressure of 10,500 psi. Both inner and outer lines shall have a 4:1 safety factor.

The hose shall include Hurst couplings on one (1) end to attach to the hydraulic tool and the other end shall connect directly to the hose reel.

Connection to reels and testing on fire department power unit shall be completed by fire department.

The hydraulic hose reel shall be located at pre construction meeting.

ADJUSTABLE SHELF OR SHELVES

Four (4) adjustable shelf or shelves (with open corners) made from 3/16" smooth aluminum sheet metal shall be provided in the body compartment(s). Each shelf shall be supported by four (4) stainless steel angles bolted to "alumastrut" tracks.

ROLLOUT TRAY(S)

One (1) rollout tray(s) constructed of 0.188" aluminum shall be provided in the all body compartment(s)side and rear. Each tray shall have edges on all four sides for added strength and be mounted on heavy duty rollers able to support a 500 lbs. load. Corners shall be open. Trays shall extend 70% of the slide length and shall be vertically adjustable on alumastrut attached to the side walls of the compartment.

Rear Body Panel Trim Material Upgrade

The rear body panel trim material shall be upgraded from smooth aluminum plate to smooth 1/8" FRP panels.

HURST TOOL PUMP MOUNTING

The Fire Department Supplies Hurst Duo Hydraulic pump will need to be mounted, connected to power, and connected to the hydraulic reels in the read body

compartment. Exact location and logistics of getting pump to the manufacture shall be worked out at the pre-construction conference. Mounting provision must be made by the manufacture but actual mounting can be made at the local dealer.

HINGED COMPARTMENT DOORS

All compartment doors shall be lap type, double panel construction with 14 gauge outer and 14 gauge 3CR12 stainless steel inner panels. (NO EXCEPTIONS TO THIS STATEMENT.) Outer pan edges that form the lap portion of the door shall be "hemmed" (bent over and back 180 degrees) over the inner pan edges. Inside corners, at the hem area, shall be welded and ground smooth. A minimum of one (1) "Z" shaped formed 14 gauge support rail (two (2) if door is wider than 14") shall be placed between the panels to stiffen and reinforce the door. Stiffener shall be welded to the inside pan and fastened to the outside pan with 3M two sided industrial strength tape.

The doors shall be weather stripped with an automotive bulb type extruded rubber inner seal. A second outer seal of closed cell rubber shall be placed on the lap edge of the door to prevent damage to the paint finish. Outer seal shall have corrugated surface to prevent sticking.

The doors shall be mounted on stainless steel piano hinges with a pin diameter of .25". Mounting holes shall be slotted vertically on one side of the hinge and horizontally on the other side to provide for proper adjustment of the door. The hinge pins shall have spun ends (crowns) at both ends to hold them in place and provide a finished look. Eberhard 206 latches with stainless steel "D" ring handles shall be provided on the lift, single, drop down, and lock door (double door set-up). The free door (double door set-up) shall have an (2) Eberhard latches top and bottom with a single handle located inside the door (standard location at bottom). Isolation tape shall be furnished between the door hinge and door jam. A rubber gasket shall be provided between the "D" ring handle and the door.

Vertically hinged doors shall be equipped with Hansen 5EZ or Thomas EZ spring type door checks that also hold the doors in the open and closed position. Checks shall be the two point mounting type for simplicity. Spring tension (15 lb.) shall be easily adjustable. Checks shall have black zinc mounting brackets with stainless steel springs, 11" long rods and clamps. Springs shall be polished. Horizontally hinged doors shall be held in the opened position with gas cylinder type stays. Switches for automatic compartment light operation shall be installed in the door hinge area.

Stainless Steel Single Drop-Down Compartment Door

A single drop-down compartment door shall be lap style and feature a 12 gauge 304L stainless steel outer skin with an 1-1/2" deep 16 gauge 304L stainless steel full inner box pan. The compartment door box pan shall be spot welded to the exterior sheet

to reduce warpage. Visible exterior side compartment door hinge mounting hardware is not acceptable. Attachment of the panel to angle iron or tubular framework with screws or pop rivets shall not be acceptable. The exterior of the door shall be painted job color.

The compartment door shall have a full length 14 gauge polished stainless steel continuous hinge with a 1/4" stainless steel center pin. Hinge pin shall be tack welded at the end to eliminate hinge pin drift, and to prevent the entry of moisture. The hinge shall be bolted to the body and to the door for easy replacement and adjustment. A minimum of three (3) 5/16" diameter holes shall be provided in the bottom of the inner door panel for drainage and ventilation.

The door shall be provided with extruded closed cell automotive type rubber moldings. This molding shall protect the compartment door framing, yet provide a weather resistant seal around the door. The door shall be double sealed with seals installed around the perimeter of the inside face of the outer door skin and full perimeter of the body door jamb.

The door latching mechanism shall be slam type Eberhard 206 bent D-ring with cast post striker assembly. The latch mechanism shall not extend beyond the inner box pan of the compartment door. Vinyl covered braided stainless steel cables shall be installed on the door.

Rubber bumpers shall be provided where open doors may strike each other.

The door jamb mounted automatic compartment light switch bracket shall be stainless steel and located at the hinged side of the compartment door.

Highly polished extruded aluminum "J" channel drip moldings shall be permanently installed above the side body doors where break-formed treadplate drip rail protection is not provided.

The door shall be installed in the following location(s): L2, R2.

Stainless Steel Double Compartment Doors

Double vertically hinged compartment doors shall be lap style and feature a 12 gauge 304L stainless steel outer skin with an 1-1/2" deep 16 gauge 304L stainless steel full inner box pan. The compartment door box pans shall be spot welded to the exterior sheet to reduce warpage. Visible exterior side compartment door hinge mounting hardware is not acceptable. Attachment of the panel to angle iron or tubular framework with screws or pop rivets shall not be acceptable. The exterior of the doors shall be painted job color.

Each compartment door shall have a full length 14 gauge polished stainless steel continuous hinge with a 1/4" stainless steel center pin. Hinge pins shall be tack

welded at the end to eliminate hinge pin drift, and to prevent the entry of moisture. The hinges shall be bolted to the body and to the door for easy replacement and adjustment. A minimum of three (3) 5/16" diameter holes shall be provided in the bottom of each inner door panel for drainage and ventilation.

Each door shall be provided with extruded closed cell automotive type rubber moldings. This molding shall protect the compartment door framing, yet provide a weather resistant seal around the door. Each door shall be double sealed with seals installed around the perimeter of the inside face of the outer door skin and full perimeter of the body door jamb.

The door latching mechanisms shall be slam type Eberhard 206 bent D-ring with cast post strikers. The latch mechanisms shall not extend beyond the inner box pan of the compartment doors. Cleveland style double spring overhead door checks shall be installed on all vertically hinged compartment doors.

The first door closed shall be equipped with an Eberhard 206 latch with cast post striker mounted directly to the upper door jamb. A vinyl covered braided stainless steel cable shall be provided from this upper door jamb striker downward to the lower middle of the inner door pan for easy access to release the latch and open the door.

The second door closed shall have an upper and lower Eberhard 206 latching mechanism with cast post strikers mounted directly to the upper and lower door jambs and actuated by a single exterior bent D-ring latch. Second closed doors that latch on the first closed door are not acceptable.

Rubber bumpers shall be provided where open doors may strike each other.

The door jamb mounted automatic compartment light switch bracket shall be stainless steel and located at the hinged side of the first open compartment door.

Highly polished extruded aluminum "J" channel drip moldings shall be permanently installed above the side body doors where break-formed treadplate drip rail protection is not provided.

The doors shall be installed in the following location(s): L1, L3, R1, R3.

Hosebed Cover

A cover constructed of Black 18 oz. PVC vinyl coated polyester shall be installed over the apparatus hosebed. The base fabric shall be 1000 x 1300 Denier Polyester with a fabric count of 20 x 20 square inch.

The front edge of the cover shall be mechanically attached to the body. The sides of the cover shall be held in place with heavy duty elastic rope running the length of the

hosebed. The rear of the cover shall have an integral flap that extends down to cover the rear of the hosebed. This flap shall be secured in place with heavy duty nylon straps to comply with the latest edition of NFPA 1901.

The cover shall have "Engine 6-13" in reflective lettering on the rear flap.

Lower Pump Module

A lower pump enclosure module shall be installed. The substructure shall be constructed entirely of 12 gauge 304L stainless steel using a break-formed design for the components. Transverse 3/16" thick 304L stainless steel break-formed cross members shall support the 12 gauge substructure and the exterior panels independently from the cab and rear body of the apparatus. The cross members shall be isolated from the frame rails using Mylar.

The pump module shall be 60" wide front to back, plus flex joints.

The pump enclosure shall be 76" wide side to side, plus running boards.

The pump enclosure shall be a free standing module supported only by the top of the frame rails in a minimum of four places, and secured with angle brackets bolted to both the pump enclosure support cross rails and the side of the chassis frame rails. This design is required to eliminate shift and stress on the pump enclosure, pump panels and running boards. A pump enclosure constructed using carbon steel or any other mounting method is not acceptable.

For side control units a maximum size brushed stainless steel vertically hinged pump service access door shall be installed on the right side of the pump enclosure and held closed with lift-and-turn style latches. A gas tube hold open arm shall be installed on the door.

For top control units a maximum size brushed stainless steel vertically hinged pump service access door shall be installed on the left and right sides of the pump enclosure and held closed with lift-and-turn style latches. A gas tube hold open arm shall be installed on the doors.

All side panels, instrument panels, and bezels shall be cut and de-burred to eliminate sharp edges. For best uniform appearance, all brushed finish on the stainless steel trim pieces shall run in the same horizontal direction.

Running Boards

Two (2) 3/16" non-skid aluminum treadplate running boards shall be bolted to the pump enclosure substructure. Running boards shall be a minimum of 12" deep. For slip resistance, the standing surface of the running boards shall be provided with Bustin Tread non-skid inserts.

Upper Pump Module

The upper pump enclosure area shall be built of 304L stainless steel with brushed stainless steel outer trim to blend with the lower module trim pieces.

Top Console Controls Area

The front of the upper pump enclosure area shall have a full width brushed stainless steel top console pump control panel as described in these specifications.

Storage Area

The entire remaining area above the enclosure shall be used for top open miscellaneous equipment storage. The floor in this area shall be non-skid aluminum treadplate.

Crosswalk Module

A 19" wide crosswalk pump operator`s area shall be provided. Crosswalk panels shall be 3/16" aluminum treadplate supported by a 304L stainless steel framework. The crosswalk shall be accessible from both sides of the truck using 3/16" aluminum treadplate running board steps, with non-slip Bustin Tread welded inserts. The supporting outriggers shall be formed using 12 gauge stainless steel. The stepping distance from the top surface of the running boards to the top surface of the crosswalk shall be designed as per NFPA requirements.

Proper flex joints are to be provided at the front and rear of the crosswalk module.

One (1) compartment with a hinged aluminum treadplate lift-up access door and butterfly latch shall be provided at each outer crosswalk entrance. Interior compartment dimensions shall be as large as practical, and interior lighting shall be provided.

Two (2) 18" long non-slip hand rails shall be installed vertically, one each side on the outer front corners of the pump enclosure at the crosswalk entrances. These hand rails are to provide the pump operator safe entrance and egress to and from the crosswalk area.

Two (2) clear lights shall be installed to illuminate the crosswalk area. A crosswalk warning sign shall be installed centered on the exterior wall of the cab per NFPA 1901 requirements.

Speedlays

Two (2) preconnected 16" wide speedlay compartments shall be provided that match the 76" width of the pump enclosure. The speedlay beds shall be vertically

stacked one over the other at the front of the pump enclosure. The speedlay assembly shall be welded integral to the front of the pump enclosure.

Each of the speedlays shall accommodate up to 300` of double jacket hose for the selected discharges. Flooring shall be maintenance free Duradek slatted fiberglass grating. The floors shall include cut-outs for the discharge swivel elbows to allow preconnected hose to be deployed from both sides of the truck.

For strength and durability, the speedlay framing shall be 1" x 2" rectangular stainless steel tubing. Interior panels shall have a machine sanded DA finish. DA finished stainless steel shall surround the openings on each side.

Running Boards

Polished 3/16" aluminum treadplate running boards shall be provided one each side of the speedlay assembly, with non-skid material that matches the style of the main pump enclosure running boards.

Top Control and Left and Right Side Pump Panels

Removable brushed stainless steel top mount control panels shall be installed. All items on these panels shall be functionally arranged. The gauge panel shall be bottom hinged for access to the gauges and controls. Two (2) knurled self-adjusting latches shall be installed to hold the panel closed.

Removable 14 gauge brushed stainless steel pump panels shall be installed on the left and right side pump panels, each with stainless steel hooded panel light shields. All items on these panels shall be functionally arranged. These panels shall have large cut-outs with stainless steel trim collars for ease of service of side mounted suction and discharge valves without requiring disassembly of the lower side panels for routine maintenance.

Pump Panel Tags

Color coded pump panel labels shall be supplied to be in accordance with NFPA 1901 compliance.

Air Horn Switch

A heavy duty weatherproof push-button switch shall be installed at the pump operator`s panel to operate the air horns.

The switch shall be labeled ”Evacuation Alert”.

Location: top mount control panel.

1030 Gallon Water Tank

A 1030 gallon (U.S.) "T" booster tank shall be supplied.

he booster tank shall be constructed of polypropylene material. The booster tank shall be completely removable without disturbing or dismounting the apparatus body structure. The top of the booster tank is fitted with removable lifting assembly designed to facilitate tank removal.

The booster tank top, sides, and bottom shall be constructed of a minimum 1/2" (0.50") thick black UV-stabilized copolymer polypropylene. Joints and seams shall be fused using nitrogen gas as required and tested for maximum strength and integrity. The tank construction shall include technology wherein a sealant shall be installed between the plastic components prior to being fusion welded. This sealing method will provide a liquid barrier offering leak protection in the event of a weld compromise. The tank cover shall be constructed of 1/2" thick polypropylene and UV stabilized, to incorporate a multi-piece locking design, which allows for individual removal and inspection if necessary. The tank cover(s) shall be flush or recessed 3/8" from the top of the tank and shall be fused to the tank walls and longitudinal partitions for maximum integrity. Each one of the covers shall have hold downs consisting of 2" minimum polypropylene dowels spaced a maximum of 40" apart. These dowels shall extend through the covers and will assist in keeping the covers rigid under fast filling conditions.

The tank shall have a combination vent and manual fill tower with a hinged lid. The fill tower shall be constructed of 1/2" polypropylene and shall be a typical dimension of 8" x 8" outer perimeter (subject to change for specific design applications). The fill tower shall be blue in color indicating that it is a water-only fill tower. The tower shall have a 1/4" thick removable polypropylene screen and a polypropylene hinged cover. The capacity of the tank shall be engraved on the top of the fill tower lid.

The booster tank shall have two (2) tank plumbing openings. One (1) for a tank-to-pump suction line with an anti-swirl plate, and one (1) for a tank fill line. All tank fill couplings shall be backed with flow deflectors to break up the stream of water entering the tank, and be capable of withstanding sustained fill rates per the tank fill inlet size.

The sump shall be constructed of a minimum of 1/2" polypropylene. The sump shall have a minimum 3" N.P.T. threaded outlet for a drain plug per NFPA. This shall be used as a combination clean-out and drain. All tanks shall have an anti-swirl plate located approximately 3" above the inside floor.

The transverse and longitudinal swash partitions shall be manufactured of a minimum of 3/8" polypropylene. All partitions shall be equipped with vent and air holes to permit movement of air and water between compartments. The partitions shall be designed to provide maximum water flow. All swash partitions interlock with one another and are completely fused to each other as well as to the walls of the

tank. All partitions and spacing shall comply with NFPA 1901. The walls shall be welded to the floor of the tank providing maximum strength.

Inside the fill tower there shall be a combination vent/overflow pipe. The vent overflow shall be a minimum of schedule 40 polypropylene pipe with an I.D. of 3" or larger that is designed to run through the tank. This outlet shall direct the draining of overflow water past the rear axle, thus reducing the possibility of freeze-up of these components in cold environments. This drain configuration shall also assure that rear axle tire traction shall not be affected when moving forward.

The booster tank shall undergo extensive testing prior to installation in the truck. All water tanks shall be tested and certified as to capacity on a calibrated and certified tilting scale.

Each tank shall be weighed empty and full to provide precise fluid capacity. Each tank shall be delivered with a Certificate of Capacity delineating the weight empty and full and the resultant capacity based on weight. Engineering estimates for capacity calculations shall not be permitted for capacity certification. The tank must be designed and fabricated by a tank manufacturer that is ISO 9001:2008 certified in each of its locations. The ISO certification must be to the current standard in effect at the time of the design and fabrication of the tank.

A tag shall be installed on the apparatus in a convenient location and contain pertinent information including a QR code readable by commercially available smart phones. The information contained on the tag shall include the capacity of the water and foam (s), the maximum fill and pressure rates, the serial number of the tank, the date of manufacture, the tank manufacturer, and contact information. The QR code will allow the user to connect with the tank manufacturer for additional information and assistance.

The tank shall have a limited Lifetime warranty that provides warranty service for the life of the fire apparatus in which the tank is installed. Warranties are transferable if the apparatus ownership changes by requesting the transfer from the tank manufacturer.

Tank capacity is 1030 US gallons / 857 Imperial gallons / 3898 Liters.

Fill Tower Location

Fill tower(s) shall be located offset to officer side of water tank.

Tank Fill

One (1) 3" pump-to-tank fill line having a manually operated 3" Akron valve. The valve control shall be located at the pump operator`s panel and shall visually indicate

the position of the valve at all times. The valve shall be controlled with a chrome handle.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position with water flowing through it.

The valve shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

Tank to Pump

One (1) manually operated 3" Akron valve shall be installed between the pump suction and the booster tank. Includes flex hose with stainless steel hose clamps for connection to the 4" tank sump outlet . The valve control shall be located at the pump operator`s panel and shall visually indicate the position of the valve at all times.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position and water is flowing through it.

The valve shall be of the unique Akron swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

A check valve shall be provided in the tank to pump supply line to prevent the possibility of "back filling" the water tank. The valve control shall be located at the pump operator`s panel and shall visually indicate the position of the valve at all times.

30 Gallon Foam Tank

A 30 gallon (U.S.) foam cell for Class A foam shall be supplied. The foam cell shall be integral to the water tank.

The integral tank top, sides, and bottom shall be constructed of black polypropylene material. Joints and seams shall be fused using nitrogen gas as required and tested for maximum strength and integrity. The tank construction shall include technology

wherein a sealant shall be installed between the plastic components prior to being fusion welded. This sealing method will provide a liquid barrier offering leak protection in the event of a weld compromise. The copolymer polypropylene material shall be used for its high strength and corrosion resistance for a prolonged tank life.

The foam tank shall have a manual fill tower. The fill tower shall be constructed of 1/2" polypropylene and shall be a typical dimension of 8" x 8" outer perimeter (subject to change for specific design applications). Foam fill tower shall be constructed of a Green, Yellow colored material indicating type of foam utilized. The capacity of the tank shall be engraved on the top of the fill tower lid. The fill tower shall be located in the forward area of the tank. The tower shall have a 1/4" thick removable polypropylene screen. Inside the fill tower, approximately 1.5" down from the top, there shall be an anti-foam fill tube that extends down to the bottom of the tank. A pressure vacuum vent shall be provided in the lid of the fill tower. The foam fill tower shall be removable to facilitate the cleaning of the foam tank.

The foam tank shall undergo extensive testing prior to installation in the truck. All foam tanks shall be tested and certified as to capacity. The tank must be designed and fabricated by a tank manufacturer that is ISO 9001:2008 certified in each of its locations. The ISO certification must be to the current standard in effect at the time of the design and fabrication of the tank.

The tank shall have a limited Lifetime warranty that provides warranty service for the life of the fire apparatus in which the tank is installed. Warranties are transferable if the apparatus ownership changes by requesting the transfer from the tank manufacturer.

Hold Downs

The ladder brackets/rack to store one (1) 3-section extension and one (1) roof ladder.

Ladder Brand

The ladder brand capable of being carried on the unit shall be Duo-Safety.

Hard Suction Tray

One (1) hard suction storage tray shall be provided and mounted to the top of the Zico drop-down ladder rack. The tray shall provide ground level access to the suction hose with the rack in the lowered position.

The hard suction tray shall be constructed of 1/8" (.125") smooth aluminum plate. The hard suction hose (hose not included) shall be secured in the tray by two (2) securing straps, one (1) each end.

Ladders

The length of ladders capable of being stored shall be the following: 35' 3-section and 14' roof ladder.

Zico Drop-Down Hard Suction Hose Rack

Zico electric drop-down hard suction hose rack. Rack located to driver's side of body. The control switching to be located on the side pump panel with the rack being in full view of the operator during operations. The rack includes (2) main rack mounted 10` trays.

Hard Suction Tray

One (1) hard suction storage tray shall be provided and mounted to the top of the Zico drop-down hard suction hose rack. The tray shall provide ground level access to the suction hose with the rack in the lowered position.

The hard suction tray shall be constructed of 1/8" (.125") smooth aluminum plate. The hard suction hose (hose not included) shall be secured in the tray by two (2) securing straps, one (1) each end.

Hosebed Folding Steps

Dual lighted LED folding steps shall be positioned to the driver side rear of the body. The steps shall be NFPA compliant for access to the hosebed storage area and in step height and surface area. The steps shall be staggered stepped as applicable with tailboard depth, not applicable with recessed step mounting.

Dual lighted LED folding step with LED lights integral to the step on the top to provide NFPA requirements of 2 FC on the stepping surface. Each step shall also have a LED light integral to the bottom of the step to meet NFPA requirements of a stepping surface up to 18" below the step.

The folding step shall sustain a minimum static load of 500 lbs. The folding step shall also meet NFPA slip resistance qualifications.

One (1) hand rail shall be installed (as applicable) in compliance with current NFPA. The hand rail shall be constructed of 6063T5 1.25" OD anodized aluminum tube, with an integral ribbed surface to assure a good grip for personnel safety, mounted between chrome stanchions.

Hosebed Folding Steps

Dual lighted LED folding steps shall be positioned to the officer side rear of the body. The steps shall be NFPA compliant for access to the hosebed storage area

and in step height and surface area. The steps shall be staggered stepped as applicable with tailboard depth, not applicable with recessed step mounting.

Dual lighted LED folding step with LED lights integral to the step on the top to provide NFPA requirements of 2 FC on the stepping surface. Folding step shall also have a LED light integral to the bottom of the step to meet NFPA requirements of a stepping surface up to 18" below the step. The folding step shall sustain a minimum static load of 500 lbs. The folding step shall also meet NFPA slip resistance qualifications.

One (1) hand rail shall be installed (as applicable) in compliance with current NFPA. The hand rail shall be constructed of 6063T5 1.25" OD anodized aluminum tube, with an integral ribbed surface to assure a good grip for personnel safety, mounted between chrome stanchions.

Additional Folding Steps

Dual lighted LED folding step(s) shall be located officer side front compartment face. The folding step(s) shall meet current NFPA in step height and surface area.

Dual lighted LED folding step with LED lights integral to the step on the top to provide NFPA requirements of 2 FC on the stepping surface. Folding step shall also have a LED light integral to the bottom of the step to meet NFPA requirements of a stepping surface up to 18" below the step. The folding step shall sustain a minimum static load of 500 lbs. The folding step shall also meet NFPA slip resistance qualifications.

One (1) hand rail shall be installed in compliance with current NFPA. The hand rail shall be constructed of 6063T5 1.25" OD anodized aluminum tube, with an integral ribbed surface to assure a good grip for personnel safety, mounted between chrome stanchions.

Crosswalk Steps

Fabricated steps shall be provided each side of the crosswalk assembly to meet NFPA. The steps, constructed of NFPA compliant aluminum treadplate, shall be bolted to the structure. The top surface of the step shall be a minimum of 35 square inches, and the step shall be able to support up to 500 lbs.

Auxiliary Steps below Tail Board

A pair of bolt-on steps below the tail board shall be provided. The steps shall align with the folding steps and be constructed of 3/16" aluminum plate and the stepping area shall include a non-slip surface.

Rear Mudflaps

The rear tires shall have a set of black mudflaps mounted behind the rear chassis wheels with logo.

Hosebed Area

The overall body height shall be 93" from the bottom of the body to the top of the upper hosebed side sheets.

The upper hose body shall be 72" wide, constructed of the same 304L stainless steel material as the compartments and shall use welded construction. The forward, top and rear edges of the body side sheets shall be formed into a 2" x 7/8" channel to ensure adequate strength.

Hosebed flooring shall be Duradek T3500 white fiberglass grating installed full length and full width of the hosebed for superior drainage and hose ventilation.

Full height stainless steel Unistrut channels shall be fastened using stainless steel hardware to the outer hose body side sheets on each side where required. These channels shall provide added strength and adjustable mounting for accessories, rear upper stanchions and upper rear hand rail mounting, if applicable. If required, the upper rear horizontal grab rail shall be 1-1/4" diameter non-slip ribbed aluminum, full width of the hosebed above the hose load.

If applicable for body type or construction methods, Cast Products highly polished stanchions shall be installed on the rear Unistrut channels. When these are provided the stanchion brackets shall be fully enclosed and shall include a removable cover to provide access to wiring and connectors.

Hosebed Capacity

The hosebed shall have the capacity to store the following hose from the driver side to the officer side – backboard storage, 400' 3" DJ, 2000' 5" LDH, 400' 3" DJ hose.

Hosebed Dividers

There shall be two (2) hosebed dividers provided the full fore-aft length of the hosebed.

The hosebed divider shall be constructed of 1/4" (0.25") smooth aluminum plate with an extruded aluminum base welded to the bottom. The rear end of the divider shall have a 3" radius corner to protect personnel. The divider shall be natural finish aluminum for long-lasting appearance and shall be sanded and de-burred to prevent damage to the hose.

The divider shall be adjustable from side to side in the hosebed to accommodate varying hose loads.

Hosebed Divider Hand Hold

There shall be a hand hole cut-out(s) on the trailing edge of each hosebed divider. The cut-out(s) is specifically sized for use in adjusting of the hosebed divider.

Overall Height Restriction

The apparatus overall height shall not exceed 10' 4".

Overall Length Restriction

The apparatus overall length shall not exceed 34'.

Floor Matting

This unit shall have all applicable compartment floors, shelves and trays covered with a heavy duty Turtle Tile brand Black floor matting.

Fuel Fill

A recessed fuel fill shall be provided at the driver side rear wheel well area.

Body Fender Panels

The construction of the wheel well assemblies shall be an integral part of the overall body design. Rear fender panels shall be formed of 12 gauge 304L stainless steel. Bright polished aluminum treadplate shall be installed to overlay the stainless panels and shall not be painted.

Mirror polished stainless steel fenderettes shall be installed at the outer panels and protrude a maximum of 3/4". Black closed cell foam rubber shall be installed between the flare and outer wheel well panel. Mounting hardware shall not be visible on the exterior of the body.

Bolt-on 16 gauge 304L stainless steel wheel well liners shall be installed, unpainted. A minimum of 1/4" spacing shall be provided at the lower leading and trailing mounting areas for drainage and ventilation.

Black rubber mudflaps shall be installed behind the rear wheels and securely fastened to the wheel well liners with stainless steel hardware.

Stainless Steel Side Body Rubrails

The rubrails shall be of 16 gauge brushed stainless steel construction, reversed hat channel style. Rubrails shall be a minimum of 2-1/4" high x 1" deep with bottom drain holes and fastened to the body below the lower side compartment doors. The

rubrail ends shall be enclosed using machined gray structural impact resistant non-corrosive copolymer material with 3/16" stand-off and mounting structure. This design is required for superior energy absorption and ease of replacement.

Wheel Well SCBA Bottle Storage

There shall be three (3) compartments suitable for storage of spare SCBA cylinders or fire extinguishers (2-1/2 gallon H20 or narrow body 20 lb. dry chemical), located one on the left side and two on the right side rear fender panels. One lap style brushed stainless steel gasketed access door with positive trigger latch mechanism shall be installed per compartment.

SCBA Straps

Straps shall be provided in each exterior storage compartment to provide secondary means to hold each SCBA bottle in the compartment. The straps shall be constructed from 1" nylon webbing formed in a loop. The strap(s) shall be mounted to the storage compartment ceiling directly inside the door opening at each bottle location.

Fire Pump System

The pump shall be a midship mounted Waterous CSU 1500-2250 single stage centrifugal pump. The pump shall be mounted on the chassis frame rails and shall be split-shaft driven.

The entire pump body and related parts shall be of fine grain alloy cast iron, with a minimum tensile strength of 30,000 psi (207 (MPa). All metal moving parts in contact with water shall be of high quality bronze or stainless steel. Pump body shall be horizontally split in two (2) sections, for easy removal of impeller assembly including wear rings and bearings from beneath the pump without disturbing pump mounting or piping.

The pump impeller shall be hard, fine grain bronze of the mixed flow design and shall be individually ground and hand balanced. Impeller clearance rings shall be bronze, easily renewable without replacing impeller or pump volute body, and of wrap-around double labyrinth design for maximum efficiency.

The impeller shaft shall be stainless steel, accurately ground with a 2-3/4" diameter spline shaft, and shall be rigidly supported at each end by oil or grease-lubricated anti-friction ball bearings for rigid and precise support. Bearings shall be protected from water and sediment by suitable stuffing boxes, flinger rings, and oil seals. The remaining bearings shall be heavy duty, deep groove ball bearings in the gearbox and shall be splash lubricated. Pump shaft must be sealed with double-lip oil seal to keep road dirt and water out of the gearbox.

Two (2) 6" diameter suction ports with 6" NST male threads and removable screens shall be provided, one each side. The ports shall be mounted one on each side of the midship pump and shall extend through the side pump panels. Inlets shall come equipped with long handle chrome caps.

Stuffing boxes shall be integral with the pump body and be equipped with two-piece glands to permit adjustment or replacement of packing without disturbing pump. Lantern rings shall be located at inner ends of stuffing boxes so that all rings of packing can be removed without removal of the lantern rings. Water shall be fed into stuffing box lantern rings for proper lubrication and cooling when pump is operating.

Discharge Manifold

The pump system shall utilize a stainless steel discharge manifold system that allows a direct flow of water to all discharge valves. The manifold and fabricated piping systems shall be constructed of a minimum of Schedule 10 stainless steel to reduce corrosion.

The apparatus manufacturer shall provide a full 10 year stainless steel plumbing components warranty. This warranty shall cover defects in materials or workmanship of apparatus manufacturer designed foam/water plumbing system stainless steel components for 10 years. A copy of the warranty document shall be provided with the proposal.

Priming System

The oil-free electrically driven priming pump shall be a positive displacement vane type. One (1) priming control, located at the pump operator`s position, shall open the priming valve and start the priming motor. The priming valve shall be electronically interlocked to the "Park Brake" circuit to allow priming of the pump before the pump is placed in gear.

Pump Shift

The pump shift shall be pneumatically controlled using a power shifting cylinder.

The power shift control valve shall be mounted in the cab, and be labeled "PUMP SHIFT". The apparatus transmission shift control shall be furnished with a positive lever, preventing accidental shifting of the chassis transmission.

A green indicator light shall be located in the cab, and be labeled "PUMP ENGAGED". The light shall not activate until the pump shift has completed its full travel into pump engagement position.

A second green indicator light shall be located in the cab and be labeled "OK TO PUMP". This light shall be energized when both the pump shift has been completed and the chassis automatic transmission has obtained converter lock-up (4th gear lock-up).

Systems

Two (2) test plugs shall be pump panel mounted for third party testing of vacuum and pressures of the pump.

A master drain valve shall be installed and operated from the pump operator`s panel. The master pump drain assembly shall consist of a Class 1 bronze master drain with a rubber disc seal and turning handle.

The manual master drain valve shall have six individually sealed ports that allow quick, simultaneous, draining of multiple intake and discharge lines. It shall be constructed of corrosion resistant material and be capable of operating at a pressure of up to 600 PSI.

The master drain shall provide independent ports for low point drainage of the fire pump and auxiliary devices.

Auxiliary Engine Cooler

An engine cooler used to lower engine water temperature during prolonged pumping operations and controlled at the pump operator`s panel shall be provided.

The engine cooler shall be installed in the engine coolant system in such a manner as to allow cool pump water to circulate around engine water, thus forming a true heat exchanger action. Cooler inlet and outlet shall be continuous, preventing intermixing of engine coolant and pump water.

Pump Rating

The fire pump shall be rated at 2000 GPM.

Pump Certification

The pump, when dry, shall be capable of taking suction and discharging water in accordance with current NFPA 1901. The pump shall be tested at the manufacturer`s facility by an independent, third-party testing service. The conditions of the pump test shall be as outlined in current NFPA 1901.

The tests shall include, at a minimum, the pump test, the pumping engine overload test, the pressure control system test, the priming device tests, the vacuum test, and the water tank to pump flow test as outlined in current NFPA 1901.

A piping hydrostatic test shall be performed as outlined in current NFPA 1901.

The pump shall deliver the percentage of rated capacities at pressures indicated below:

100% of rated capacity at 150 psi net pump pressure
100% of rated capacity at 165 psi net pump pressure
70% of rated capacity at 200 psi net pump pressure
50% of rated capacity at 250 psi net pump pressure

A test plate, installed at the pump panel, shall provide the rated discharges and pressures together with the speed of the engine as determined by the certification test, and the no-load governed speed of the engine.

A Certificate of Inspection certifying performance of the pump and all related components shall be provided at time of delivery. Additional certification documents shall include, but not limited to, Certificate of Hydrostatic Test, Electrical System Performance Test, Manufacturer`s Record of Pumper Construction, and Certificate of Pump Performance from the pump manufacturer.

Waterous Overheat Protection Manager

A Waterous Overheat Protection Manager shall be provided and located at the pump operator`s panel. The device shall consist of a valve that opens when the water in the pump reaches 140 degrees F and a warning light shall be triggered by a thermal switch when the water in the pump reaches 180 degrees F. The Overheat Protection Manager shall act as a safety device by releasing hot water from the discharge area of the pump to the ground or back to a water tank.

Steamers

The pump 6" steamer intake(s) shall be mounted approximately 1” from the pump panel to back of cap when installed. The "Flush+1" dimension can vary + or - 1-1/4" or as practicable depending on the pump module width and options selected. (Example 72" or 76" modules.)

Location: driver's side, officer's side.

Pump Anodes

The anodes help prevent damage caused by galvanic corrosion within the pump. The system provides a sacrificial metal which helps to diminish or prevent pump and pump shaft galvanic corrosion. One (1) anode will be located on the suction side and one (1) will be located on the discharge side of the pump.

Pump Seal

A mechanical seal shall be supplied with the pump and shall include an alternate seal housing that shall be equipped with self-adjusting, maintenance-free, mechanical shaft seals which eliminates the need for packing.

Monarch Waterous Electric Actuated Valve

A Waterous Monarch valve shall be provided for the driver, officer and front intake. The inlet valve shall be operated by a 12 VDC electric motor with a remote switch provided at the pump operator`s position. The 12 VDC motor shall be provided with an automatic resetting, thermally-compensated over-current protection circuit breaker to protect the 12 VDC motor and apparatus electrical system. The gear actuator on the valve will cycle from full closed to full open in not less than three (3) seconds. A manual override shall be provided behind the officer side panel.
An indicator light panel shall be located at the pump operator`s position to show valve open, closed, or traversing from open to closed.

A adjustable pressure relief valve shall be provided. The pressure relief valve shall be factory set to 125 psi. The pressure relief valve shall provide overpressure protection for the suction hose even when the intake valve is closed.

A 1/4" air bleeder valve shall be provided and controlled at the pump operator`s position.

A 3/4" water bleeder shall be supplied and controlled at the pump panel position.

Master Drain Valve

A manual master drain valve shall be installed on the pump panel. The master pump drain assembly shall consist of a Class 1 bronze master drain with a rubber disc seal. The master drain shall have a rubber seal to prevent water from running out on the running board.

The manual master drain valve shall have twelve (12) individual-sealed ports that allow quick and simultaneous draining of multiple intake and discharge lines. It shall be constructed of corrosion-resistant material and be capable of operating at a pressure of up to 600 PSI.

The master drain shall provide independent ports for low point drainage of the fire pump and auxiliary devices.

Pump Cooler

The pump shall have a 3/8" line installed from the pump discharge to the booster tank to allow a small amount of water to circulate through the pump casing in order to cool the pump during sustained periods of pump operation when water is not being discharged. The pump cooler line shall be controlled from the pump

operator`s panel by a Innovative Controls 1/4 turn valve with "T" handle. Each 1/4 turn handle grip shall feature built-in color-coding labels and a verbiage tag

2.5" Auxiliary Intake

Two (2) 2-1/2" suction inlet with a manually operated 2-1/2" Akron valve shall be provided on the driver side pump panel and one on the passenger side pump panel.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position and water is flowing through it.

The valve shall be of the unique Akron swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The outlet of the valve shall be connected to the suction side of the pump with the valve body located behind the pump panel. The valve shall come equipped with a brass inlet strainer, 2-1/2" NST female chrome inlet swivel and shall be equipped with a chrome plated rockerlug plug with a retainer device.

The valve shall be controlled by a vertically mounted quarter turn locking handle located on the top mounted pump operator`s panel and shall visibly indicate the position of the valve at all times.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance, and decreased friction loss.

A 3/4" bleeder valve assembly will be installed on the side pump panel.

Front Intake

A 5" stainless steel pipe shall extend from the right suction side of the pump to the front of the apparatus. All fabricated piping used in the front suction shall be constructed of a minimum of Schedule 10 stainless steel pipe to reduce corrosion of the lines. 3/4" valve(s) shall be provided to allow water to be drained.

A heavy duty 6" 90 degree cast brass elbow designed and constructed specifically for fire/emergency vehicle usage shall serve as the auxiliary front suction inlet. The elbow, also referred to as the "swivel", shall be attached to the front suction piping. This component shall have the following features:

1) The ability to rotate 180 degrees.

2) A rugged twist-lock mechanism to hold the elbow in place at the desired position.

3) A double-ball race with bronze balls.

4) A 5" NPT free swivel female inlet.

5) A 6" NST male outlet with strainer.

6) Cast brass with polished chrome finish.

The elbow/swivel shall be mounted so that it extends above the extended front bumper.

Front Jump Line

One (1) 1-1/2" preconnect outlet with a manually operated Akron valve shall be supplied to the extended front bumper. The preconnect shall consist of a 2" heavy duty hose coming from the pump discharge manifold to a 2" FNPT x 1-1/2" MNST mechanical swivel hose connection to permit the use of the hose from either side of the apparatus.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position with water flowing through it.

The valve shall be of the unique Akron swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

An air blow-out valve shall be installed between the chassis air reservoir and the front jump line. The control shall be installed on the pump operator`s panel.

The discharge shall be supplied with a Class 1 automatic 3/4" drain valve assembly. The automatic drain shall have an all-brass body with stainless steel check assembly. The drain shall normally be open and automatically close when the pressure is greater than 6 psi.

The valve control shall be located at the pump operator panel and shall visually indicate the position of the valve at all times.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

There shall be a polished stainless steel swivel elbow provided for the front bumper discharge located on top of the bumper driver's side of center tray.

Double Speedlay

One (1) double speedlay discharge shall be provided. Each speedlay section shall include one (1) 2" brass swivel with a 1-1/2" hose connection to permit the use of the hose from either side of the apparatus.

The speedlay piping shall consist of two (2) 2" heavy duty hoses coming from the pump discharge manifold to the 2" swivel. The discharges shall include a manually operated Akron valve.

The 2" valves shall be Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valves shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position with water flowing through it.

The valves shall be of the unique Akron swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The valve controls shall be located at the pump operator`s panel and shall visually indicate the position of the valves at all times.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

2.5" Right Panel Discharge

One (1) 2-1/2" discharge outlet with a manually operated Akron valve shall be provided at the right side pump panel.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position with water flowing through it.

The valve shall be of the unique Akron swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The valve control shall be located at the pump operator panel and shall visually indicate the position of the valve at all times.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

Location: right side discharge 2.

2.5" Left Panel Discharge

One (1) 2-1/2" discharge outlet with a manually operated Akron valve shall be provided at the left side pump panel.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position with water flowing through it.

The valve shall be of the unique Akron swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The valve control shall be located at the pump operator panel and shall visually indicate the position of the valve at all times.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

Location: Left side discharge 2.

2.5" Right Rear Discharge

One (1) 2-1/2" discharge outlet with a manually operated Akron valve shall be supplied to the right rear of the apparatus by a 2-1/2" stainless steel pipe.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position with water flowing through it.

The valve shall be of the unique Akron swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The valve control shall be located at the pump operator panel and shall visually indicate the position of the valve at all times.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

Location: right rear discharge.

4" Left Panel Discharge

One (1) 4" discharge outlet with a 4" electrically-operated Akron valve shall be provided at the side pump panel. The discharge shall consist of a 4" valve connected to a 4" MNST adapter. The adapter shall protrude through the pump panel. The

end of the discharge adapter shall be equipped with a chrome-plated, rocker-lug cap with a retainer chain.

The valve shall be an Akron 8600HD series with 316 stainless ball and polymer seals for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the chrome-plated brass ball when in a throttle position with water flowing through it. The valve shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The valve shall utilize an electric driven worm gear actuator with a Navigator 9323 controller. The 9323 controller shall be located at the pump operator`s panel and contain indicator lights for open, closed and throttled valve positions. The valve may also be operated manually in case of electrical system failure.

4" Right Panel Discharge

One (1) 4" discharge outlet with a 4" electrically-operated Akron valve shall be provided at the side pump panel. The discharge shall consist of a 4" valve connected to a 4" MNST adapter. The adapter shall protrude through the pump panel. The end of the discharge adapter shall be equipped with a chrome-plated, rocker-lug cap with a retainer chain.

The valve shall be an Akron 8600HD series with 316 stainless ball and polymer seals for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the chrome-plated brass ball when in a throttle position with water flowing through it. The valve shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The valve shall utilize an electric driven worm gear actuator with a Navigator 9323 controller. The 9323 controller shall be located at the pump operator`s panel and contain indicator lights for open, closed and throttled valve positions. The valve may also be operated manually in case of electrical system failure.

Deck Gun

One (1) 4" deck gun discharge outlet with an electrically operated Akron valve and 4" stainless steel pipe shall be provided above the pump compartment.

Piping shall be rigidly braced as necessary and installed securely so no movement develops when the line is charged.

The valve shall be an Akron 8840E HD series with a bronze flat ball design for ease of operation and increased abrasion resistance. The valve shall have a self locking

ball feature using an automatic friction lock design to balance the brass ball when in a throttle position and water is flowing through it.

The valve shall be of the unique Akron swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The 9323 Valve Controller from Akron Brass provides reliable and accurate valve control with valve position indication • Manual override valve actuation

The discharge shall be supplied with a 3/4" bleeder valve assembly. The bleeder valve shall be installed to drain water from the gauge pressure line to prevent freezing of the line. The drain shall be controlled with a quarter-turn valve on the pump panel.

The valve controls and indicators shall be located at the pump operator`s panel.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

Deck gun piping shall be positioned centered in deck gun channel. This location shall allow for optimal operation of a deck gun monitor once installed.

Deckgun Monitor

An Akron Stream Master II manual monitor (2000 GPM) shall be supplied and installed.

Bleeder Drain Valves

Each discharge shall be supplied with a 3/4" bleeder valve assembly. The bleeder valve shall be installed to drain water from the gauge pressure line to prevent freezing of the line. The drain shall be controlled with a quarter-turn valve on the pump panel.

Top Mount Valve Controls

For valve actuation, the apparatus pump panel shall be equipped with Innovative Controls Top Mount Valve Controls. The ergonomically designed grip-activated T-handles shall be chrome-plated zinc with recessed UV-resistant labels for color-coding and verbiage. The patented spring-loaded handle and control rod assembly shall open and close valves when the user simply squeezes the T-handle and pivots the rod. When the T-handle grip is released, the valve control shall lock at the desired position automatically to eliminate valve drift. No secondary manual tightening method shall be required.
A robust die cast and chrome-plated pivot arm shall house the internal locking mechanism protecting it from environmental hazards. A brass bushing and closely-

toleranced stainless steel rod shall ensure long-term smooth valve control operation and never require lubrication.
The valve control handles shall mount to sections of decorative clear anodized aluminum extrusion, designed to evenly space the handles and provide a secure mount for the handle's pivot rod.

Garnish Ring Bezel

Innovative Controls intake and/or discharge garnish rings shall be installed to the apparatus with mounting bolts. These bezel assemblies will be used to identify intake and/or discharge ports with color and verbiage. These garnish rings are designed and manufactured to withstand the specified apparatus service environment and shall be backed by a warranty equal to that of the exterior paint and finish. The specified assemblies feature a chrome-plated panel-mount bezel with durable UV resistant polycarbonate inserts. These UV resistant polycarbonate graphic inserts shall be sub-surface screen printed to eliminate the possibility of wear and protect the inks from fading. All insert labels shall be backed with 3M permanent adhesive (200MP), which meets UL969 and NFPA standards.

Pump Pressure Governor

The apparatus shall be equipped with a Class 1 engine/pump pressure governor/throttle system connected directly to the Electronic Control Module (ECM) mounted on the engine. The governor shall control and monitor the pump master discharge pressure, eliminating any need for a relief valve on the discharge side of the pump. A special preset feature shall permit a pre-determined pressure or RPM to be set and hold it against varying flow rates at independent discharge lines by modulating engine rotation speed. Control of the engine speed shall be dictated by pre-programmed software in the electronic control module. The preset shall be easily adjustable by the operator.

The Class 1 system shall be installed in place of the discharge relief valve and the pump panel mounted hand throttle.

A display/control until shall be mounted on the pump operator`s panel. The control unit shall be a self-contained, weatherproof module, approximately 4.5" W x 6" H. The display unit shall provide alpha-numeric display.

Foam Tank Level Gauge

Fire Research TankVision model WL2700 Class A foam tank volume indicator kit shall be installed. The kit shall include an electronic indicator module, a pressure sensor, a 12` sensor cable and a tank vent. The indicator shall show the volume of Class A foam concentrate in the tank on nine (9) easy to see super bright LEDs. A wide view lens over the LEDs shall provide for a viewing angle of 180 degrees. The

indicator case shall be waterproof, manufactured of aluminum, and have a distinctive yellow label.

The program features shall be accessed from the front of the indicator module. The program shall support self-diagnostics capabilities, self-calibration, and a data link to connect remote indicators. Low foam warnings shall include flashing LEDs at 25%, down chasing LEDs when the tank is almost empty, and an output for an audio alarm.

The indicator shall receive an input signal from an electronic pressure sensor. The sensor shall be mounted on the outside of the foam tank near the bottom; no probe shall placed on the interior of the tank. The foam tank vent shall be installed top mount on the foam fill tower. Wiring shall be weather resistant and have automotive type plug-in connectors.

Note: If the flow rate of foam concentrate from the tank will exceed 60 GPM, two (2) vents will be required.

Pressure Gauges

Class 1 weatherproof 2-1/2" compound vacuum pressure gauge with a range of 30-0-400 shall be installed on the pump panel for each discharge. The gauge shall be filled with a liquid solution to assure visual reading to within 1% accuracy.

Tank Level Gauge

One (1) FRC TankVision water tank level gauge shall be located at the pump operator`s panel to provide a high-visibility display of the water tank water level. Ten (10) high-intensity light emitting diodes (LED`s) on the display module shall have a 3 dimensional lens allowing the full, 3/4, 1/2, 1/4, and refill levels to be easily distinguished at a glance with full 180 degree visibility.

The display module shall be protected from vibration and contamination with the components being encased in an encapsulated plastic housing. The long life and extreme durability of LED indicators eliminates light bulb replacement and maintenance. Color-coded cover plates shall complete the assembly of the display module to the pump panel. System calibration shall be accomplished via supplied magnet. Each display level can be set independently for maximum reliability.

The display shall provide a steady indication of fluid level despite sloshing inside of the tank when the vehicle is in motion due to an "anti-slosh" feature. In addition to the pump panel mounted lights there shall be one)1) Whelen PSTank series LED (Light Emitting Diode) Strip-Light installed each side as specified.

The system shall be controlled by a tank level driver module that is integral of the NFPA required pump panel mounted tank level light assembly.

The additional tank level system shall be interlocked through the parking brake assembly so as not to be on while the vehicle is in motion.

The remote strip-lights shall be arranged as follows.

Full Green
3/4 Blue
1/2 Amber
1/4 Red

Location of Whelen PSTank Strip-Lights: forward of body up high.

Additional Tank Level Gauge

The additional indicator shall show the volume of water in the tank on nine (9) easy to see super bright LEDs. A wide view lens over the LEDs shall provide for a viewing angle of 180 degrees. The indicator case shall be waterproof, manufactured of aluminum, and have a distinctive blue label. Shall be located officer rear.

Engine Gauge Package

An engine gauge package shall be supplied at the pump operator`s panel to monitor the vehicle`s engine. The weatherproof package shall include the following:

• Deluxe Tachometer - to monitor engine revolutions, fuel, and transmission temperature.
• Oil pressure gauge - to monitor engine oil pressure with integrated low oil indicator.
• Water temperature gauge - to monitor the engine water temperature with integrated high water temperature indicator.
• Voltmeter - connected to the vehicle electrical system w/integrated high and low voltage indicator.
• Engine alarm system - a buzzer alarm for audible warning.

Master Pressure Gauges w/Bezel

The master intake and master discharge gauges shall be 4"(101mm) diameter IC pressure gauges. Each gauge shall have a rugged corrosion free stainless steel case and clear scratch resistant molded crystals with captive O-ring seals to ensure distortion free viewing and seal the gauge. The gauges shall be filled with a synthetic mixture to dampen shock and vibration, lubricate the internal mechanisms, prevent lens condensation and ensure proper operation from –40F to +160F. Each gauge shall meet ANSI B40.1 Grade 1A requirements with an accuracy of +/- 1% full scale and include a size appropriate phosphorous bronze bourdon tube with a reinforced lap joint and large tube base to increase the tube life and gauge accuracy.

The two master gauges shall be installed into decorative chrome-plated zinc mounting bezel that also incorporates a test port manifold and a graphic overlay that identifies the master intake and discharge gauges, the vacuum test port, and the pressure test port. The test port manifold is solid cast brass with chrome plated plugs. The master gauges shall be installed on the pump panel no more than 6 inches apart. The gauge on the left shall be the master pump intake gauge and display a range from 30" vac to 400 psi with black graphics on a white background. The gauge on the right shall be the master pump discharge gauge and display a range from 0 to 400 psi with black graphics on a white background.

Foam System Certification

The foam system performance shall be tested and certified in compliance with 2009 NFPA 1901.

Waterous One Step CAFS

The apparatus shall be equipped with a Waterous One-Step compressed air foam system that is installed to provide foam solution or compressed air foam to the specified discharges.

ONE STEP™ CAFSystem Specification

A. Compressed Air Foam System

The Waterous One Step™ compressed air foam system (CAFS) shall be installed to provide compressed air foam to three discharges (either (3) 1.75" hoselines or (2) 1.75" hoselines and (1) 2.5" hoseline) of the vehicle. The user must be able to operate either two (2) 1.75" CAFS handlines simultaneously OR (1) 1.75" handline and (1) 2.5" handline simultaneously.

1. Air Compressor
The air compressor shall be an oil-flooded, rotary screw type, sized to supply a minimum of 150 CFM of free air at minimum of 113 P.S.I.G. The air compressor shall be capable of maintaining prolonged pressures at 113 P.S.I.G. throughout its service life. The sump/pressure vessel shall have an oil level indicator, air pressure relief valve and threaded fill cap/plug.

A. Pneumatic Modulating Inlet Valve
The air compressor shall be controlled by a pneumatic modulating inlet valve mounted on the air end inlet. This controller shall sense air pressure and control the air delivery of the air end while maintaining constant pressure.
B. Systems with balancing pressure valves will not be permitted.

2. Air Compressor Drive
The compressor shall be belt driven directly and no clutch installment will be

allowed. (150-D). The compressor shall be PTO driven. (-P) The compressor system shall operate in unload and fixed (113 PSI). The compressor system shall be automatically controlled by the CAFS controller touch screen.

3. Air Compressor Oil System
The air compressor system shall feature a spin-on, full-flow oil filter unit to control oil flow to the cooler.
A. Modular Air/Oil Separator Unit
A modular air/oil separator unit with spin-on element shall be provided with the sump tank. Replacement elements for the oil filter and separator shall be readily available.
B. Oil Lines
All oil lines shall be routed in braided hose conforming to SAE 100R1 standards for hydraulic hose.
4. Air Compressor Cooling System
The air compressor shall be cooled by the apparatus fire pump, utilizing an all copper and brass shell and tube heat exchanger. Water shall flow through the heat exchanger whenever the fire pump is operating. An in-line strainer shall be provided on the water inlet side of the heat exchanger to prevent clogging. The strainer shall be removable for cleaning.
The compressor cooling system shall be capable of maintaining recommended operating temperatures throughout its full operating range at ambient temperatures up to 115°F.
5. Air Controls and Instruments
A 7" touchscreen panel shall be provided to control functions of each compact foam generator. Air pressure, pressure of each ONE STEP™ CAFSystem discharge, air pressure and compressor oil temperature will be displayed by the touchscreen. The air control should be automatically controlled by the 7" touchscreen panel. When the ONE STEP™ CAFSystem is not activated the compressor shall run in an unloaded state.
6. Plumbing
Each CAFS outlet shall have a dedicated pneumatically driven foam generator which must ensure the adequate and proper mixture of air, water and foam solution in order to deliver a constant, reproducible and efficient firefighting extinguishing media.
A pressure reducing valve shall be supplied for total control of the water pressure supply to the foam generators for CAFS operation.The foam generators shall have a water flow on/off function, an air flow on/off function, volume control, and check valves.The two (2) foam generators for 1.75" handlines shall have a minimum water flow of 55 GPM of water per minute each. The foam generator for the 2.5" handline shall have a minimum water flow of 70 GPM. All foam generators shall provide an extinguishing media with a minimum expansion ratio of 5.5. Each outlet shall be equipped with a mixing pressure control valve in order to ensure the same quality of foam at all times for the safety of firefighters. Each outlet shall be calibrated to a Constant foam flow and consistency. No manual adjustments shall be allowed in order to prevent operator error.

7. System
Drawings of a top, side and rear view of these foam generating devices shall be provided during the bid.
During the bid, Pressure loss charts must be provided validation for flows and hose diameters for all three outlets.
During the bid, Maximum delivery length and height must be provided for all three outlets.

8. Foam Management System – Advantus

A fully automatic electronic direct foam injection system is furnished and installed. The system is capable of Class A foam concentrates. The system includes the following:
A. Digital Electronic Control Display
The system shall be equipped with a digital electronic control display. It shall be installed on the pump operators panel and enable the pump operator to perform the following control and operation functions:
1. Provide push-button control of foam proportioning rates from 0.1% to 1%.
2. Show current flow-per-minute of water
3. Show total volume of water discharged during and after foam operations are completed
4. Show total amount of foam concentrate used
5. Perform setup and calibrate functions for the microcontroller
6. Flash a "low concentrate" warning when the foam concentrate tank(s) run(s) low
7. Flash an "error" warning with associated code in the event of an electronic malfunction.
8. Provide a manual back-up mode, controlled by the operator

CAFS System Plumbing

The specified CAFS foam system shall be plumbed to 1.5 first speedlay, 1.5 second speedlay, driver's side front jump line.

Vehicle Data Recorder

A vehicle data recorder system shall be provided to comply with NFPA 1901, 2009 edition. The following data shall be monitored:

- Vehicle speed MPH
- Acceleration (from speedometer) MPH/Sec.
- Deceleration (from speedometer) MPH/Sec.
- Engine speed RPM
- Engine throttle position % of full throttle
- ABS Event On/Off
- Seat occupied status Occupied Yes/No by position
- Seat belt status Buckled Yes/No by position

- Master Optical Warning Device Switch On/Off
- Time: 24 hour time
- Date: Year/Month/Day

Occupant Detection System

There shall be a visual and audible warning system installed in the cab that indicates the occupant buckle status of all cab seating positions that are designed to be occupied during vehicle movement.

The audible warning shall activate when the vehicle's park brake is released and a seat position is not in a valid state. A valid state is defined as a seat that is unoccupied and the seat belt is unbuckled, or one that has the seat belt buckled after the seat has been occupied.

The visual warning shall consist of a graphical display that will continuously indicate the validity of each seat position.

The system shall include a display panel with LED back-lit ISO indicators for each seating position, seat sensor and safety belt latch switch for each cab seating position, audible alarm and braided wiring harness.

The display panel shall be located inboard on driver's side overhead console.

Multiplex Electrical System

Electrical System

The apparatus shall incorporate a Weldon V-MUX multiplex 12 volt electrical system. The system shall have the capability of delivering multiple signals via a CAN bus. The electrical system installed by the apparatus manufacturer shall conform to current SAE standards, the latest FMVSS standards, and the requirements of the applicable NFPA 1901 standards.

The electrical system shall be pre-wired for optional computer modem accessibility to allow service personnel to easily plug in a modem to allow remote diagnostics.

The electrical circuits shall be provided with low voltage over-current protective devices. Such devices shall be accessible and located in required terminal connection locations or weather-resistant enclosures. The over-current protection shall be suitable for electrical equipment and shall be automatic reset type and meet SAE standards. All electrical equipment, switches, relays, terminals, and connectors shall have a direct current rating of 125 percent of maximum current for which the circuit is protected. The system shall have electro-magnetic interference suppression provided as required in applicable SAE standards.

Any electrical junction or terminal boxes shall be weather-resistant and located away from water spray conditions.

Multiplex System

For superior system integrity, the networked multiplex system shall meet the following minimum component requirements:

• The network system must be Peer to Peer technology based on RS485 protocol. No one module shall hold the programming for other modules. One or two modules on a network referred to as Peer to Peer, while the rest of the network consists of a one master and several slaves is not considered Peer to Peer for this application.
• Modules shall be IP67 rated to handle the extreme operating environment found in the fire service industry.
• All modules shall be solid state circuitry utilizing MOS-FET technology and utilize Deutsch series input/output connectors.
• Each module that controls a device shall hold its own configuration program.
• Each module should be able to function as a standalone module. No "add-on" module will be acceptable to achieve this form of operation.
• Load shedding power management (8 levels).
• Switch input capability for chassis functions.
• Responsible for lighting device activation.
• Self-contained diagnostic indicators.
• Wire harness needed to interface electrical devices with multiplex modules.
• The grounds from each device should return to main ground trunk in each sub harness by the use of ultrasonic splices.

Wiring

All harnessing, wiring and connectors shall be manufactured to the following standards/guidelines. No exceptions.

• NFPA 1901-Standard for Automotive Fire Apparatus
• SAE J1127 and J1127
• IPC/WHMA-A-620 – Requirements and Acceptance for Cable and Wire Harness Assemblies. (Class 3 – High Performance Electronic Products)

All wiring shall be copper or copper alloys of a gauge rated to carry 125 of the maximum current for which the circuit is protected. Insulated wire and cable 8 gauge and smaller shall be SXL, GXL, or TXL per SAE J1128. Conductors 6 gauge and larger shall be SXL or SGT per SAE J1127.

All wiring shall be colored coded and imprinted with the circuits function. Minimum height of imprinted characters shall not be less than .082" plus or minus .01". The imprinted characters shall repeat at a distance not greater than 3".

A coil of wire shall be provided behind electrical appliances to allow them to be pulled away from mounting area for inspection and service work.

Wiring Protection

The overall covering of the conductors shall be loom or braid.

Braid style wiring covers shall be constructed using a woven PVC-coated nylon multifilament braiding yarn. The yarn shall have a diameter of no less than .04" and a tensile strength of 22 lbs. The yarn shall have a service temperature rating of -65 F to 194 F. The braid shall consist of 24 strands of yarn with 21 black and 3 yellow. The yellow shall be oriented the same and be next to each other.

Wiring loom shall be flame retardant black nylon. The loom shall have a service temperature of -40 F to 300 F and be secured to the wire bundle with adhesive-backed vinyl tape.

Wiring Connectors

All connectors shall be Deutsch series unless a different series of connector is needed to mate to a supplier's component. The connectors and terminals shall be assembled per the connector/terminal manufacturer's specification. Crimble/Solderless terminals shall be acceptable. Heat shrink style shall be utilized unless used within the confines of the cab.

NFPA Required Testing of Electrical System

The apparatus shall be electrical tested upon completion of the vehicle and prior to delivery. The electrical testing, certifications, and test results shall be submitted with delivery documentation per requirements of NFPA 1901. The following minimum testing shall be completed by the apparatus manufacturer:

1. Reserve capacity test:

The engine shall be started and kept running until the engine and engine compartment temperatures are stabilized at normal operating temperatures and the battery system is fully charged. The engine shall be shut off and the minimum continuous electrical load shall be activated for ten (10) minutes. All electrical loads shall be turned off prior to attempting to restart the engine. The battery system shall then be capable of restarting the engine. Failure to restart the engine shall be considered a test fail.

2. Alternator performance test at idle:

The minimum continuous electrical load shall be activated with the engine running at idle speed. The engine temperature shall be stabilized at normal operating

temperature. The battery system shall be tested to detect the presence of battery discharge current. The detection of battery discharge current shall be considered a test failure.

3. Alternator performance test at full load:

The total continuous electrical load shall be activated with the engine running up to the engine manufacturer`s governed speed. The test duration shall be a minimum of two (2) hours. Activation of the load management system shall be permitted during this test. However, an alarm sounded by excessive battery discharge, as detected by the system required in NFPA 1901 Standard, or a system voltage of less than 11.7 volts DC for a 12 volt nominal system, for more than 120 seconds, shall be considered a test failure.

4. Low voltage alarm test:

Following the completion of the above tests, the engine shall be shut off. The total continuous electrical load shall be activated and shall continue to be applied until the excessive battery discharge alarm activates. The battery voltage shall be measured at the battery terminals. With the load still applied, a reading of less than 11.7 volts DC for a 12 volt nominal system shall be considered a test failure. The battery system shall then be able to restart the engine. Failure to restart the engine shall be considered a test failure.

NFPA Required Documentation

The following documentation shall be provided on delivery of the apparatus:

A. Documentation of the electrical system performance tests required above.

B. A written load analysis, including:

a. The nameplate rating of the alternator.
b. The alternator rating under the conditions.
c. Each specified component load.
d. Individual intermittent loads.

Multiplex Display

The V-MUX multiplex electrical system shall include a text display.

The display shall have the following features:

- Rugged vacuum fluorescent technology
- Two twenty character lines
- Programmed to show door ajar status and diagnostic information

The display shall be located center of dash.

Light Bar

A Whelen Freedom series model FN72QLED 72" all LED light bar shall be installed. The light bar shall have clear lenses and contain two (2) front corner mounted red LED modules and ten (10) front LED modules, six (6) red and four (4) white, and two (2) end mounted red LED modules. The light bar shall be equipped with MK8 mounts.

The white LEDs shall be switched off in blocking right of way mode.

The light bar shall be installed centered on the front cab roof.

Side Light Bars

A pair of Whelen 24" Mini-Freedom LED light bars model FT8RRRRF with MK8H high mounts shall be provided. The light bars shall have clear domes with red LEDs.

The clear LEDs (if applicable) shall be switched off in blocking right of way mode.

The light bars shall be installed in the following location: each side over front cab doors.

Lower Level Warning Light Package

Ten (10) Whelen M6R Super LED red light heads shall be provided.

The rectangular lights shall include black flanges where applicable. The lights shall be wired with weatherproof connectors and shall be mounted as close to the corner points of the apparatus as is practical as follows:

• Two (2) on the front of the apparatus facing forward (part of headlight bezel)
• Two (2) on the rear of the apparatus facing rearward (part of tail light bezel)
• Two (4) lights each side of the apparatus, one (1) each side at the forward most point (as practical), and one (1) each side at the rearward most point (as practical).
• Two (2) lights each side of the apparatus, one (1) each side of the apparatus centrally located to provide mid ship warning light.

The side facing lights shall be located at forward most position, centered in rear wheel well, and on side of beavertail.

All warning devices shall be surface mounted in compliance with NFPA standards.

Upper Rear Warning Lights

Whelen model B63 beacons shall be supplied on polished aluminum mounts. Each unit shall consist of a LED upper beacon with red dome and an M7 series LED with clear lens.
The lights shall be located each side on rear stanchions to meet upper Zone C requirements.

Hazard (Door Ajar) Light

There shall be a 2" red LED hazard light installed as specified.

The light shall be located center overhead.

Directional Traffic Warning Light

One (1) Whelen TAL65 LED 36" long Traffic Advisor with amber lenses shall be provided. The unit shall have a manual override of directional signal with a slide switch mounted in the chassis cab.

The light shall be installed at the rear of the body to direct traffic around the vehicle.

Directional Light Bar Control Location

The directional light bar control head shall be located in the center overhead console offset to officer side.

Electronic Siren

A Whelen 295SLSA1 electronic siren shall be installed in the cab. The siren amplifier and control panel module shall include a rotary selector for six (6) functions, on/off switch, push button switch for manual siren or air horn tones, and noise canceling microphone.

Electronic Siren Control Location

The electronic siren control shall be located in the center overhead.

Mechanical Siren

A chrome plated flush mounted Federal Q2B-NN coaster siren shall be installed in the front bumper. An electric siren brake switch shall be located in the cab accessible to driver.

The siren shall be located on the driver's side.

Siren Speaker

One (1) Whelen model SP123BMC, 100 watt speaker with chrome grill shall be recessed in the front bumper.

The speaker shall produce a minimum sound output of 120 dB at 10 feet to meet current NFPA 1901 requirements.

The speaker shall be located officer side front bumper.

License Plate Light

One (1) Truck-Lite model 15905 white LED license plate light mounted in a Truck-Lite model 15732 chrome plated plastic license plate housing shall be mounted at the rear of the body.

Tail Lights

Three (3) Whelen model M6 series LED (Light Emitting Diode) lights shall be installed in a four (4) light vertical housing each side at rear and wired with weatherproof connectors.

Light functions shall be as follows:

• LED red running light with red brake light in upper position.
• LED amber populated arrow pattern turn signal in middle position.
• LED clear back-up light in lower position.

A one-piece chrome plastic housing shall be mounted around the three (3) individual lights in a vertical position. The lower space will be used by the M6 or equivalent lower NFPA warning light.

LED Marker Lights

LED clearance/marker lights shall be installed as specified below.

Upper Cab:

• Five (5) amber LED clearance lights on the cab roof.

Lower Cab:

• One (1) amber LED side turn/marker each side of the cab ahead of the front door hinge.

Upper Body:

• One (1) red Truck-Lite LED upper clearance light each side, rear of body, visible to the sides and rear of the vehicle.

Lower Body:

• Three (3) red Truck-Lite LED clearance lights centered at rear, recessed in the rear tailboard area.
• One (1) red Truck-Lite LED clearance light each side at the trailing edge of the body as far rearward as practical.

Compartment Light Package

Two (2) ROM V4 compartment light strips shall be mounted in each body compartment greater than 4 cu. ft. Transverse compartments shall have four (4) lights located two (2) each side.

Each light bar shall include super bright white LEDs mounted to circuit boards that have acrylic conformal coating for corrosion protection. The LED circuit boards shall be mounted to an extruded aluminum base with lexan lens. The light shall produce 250 lumens per foot and be waterproof up to 1 meter (3.3 feet).

Compartment lights shall be wired to a master on/off rocker switch on the cab switch panel.

The wiring connection for the compartment lights shall be made with a weather-resistant plug in style connector. A single water and corrosion-resistant switch with a polycarbonate actuator and sealed contacts shall control each compartment light. The switch shall allow the light to illuminate if the compartment door is open.

Ground Lights

The apparatus shall be equipped with a sufficient quantity of lights to properly illuminate the ground areas around the apparatus in accordance with current NFPA requirements. The lights shall be 4" circular LED (Light Emitting Diode) with clear lenses mounted in a resilient shock absorbent mount for improved bulb life. The wiring connections shall be made with a weather resistant plug in style connector.

Ground area lights shall be switched from the cab dash with the work light switch.

One (1) ground light shall be supplied under each side of the front bumper extension if equipped.

Lights in areas under the driver and crew area exits shall be activated automatically when the exit doors are opened.

Recessed Step Lights

Two (2) recessed 4" LED lights with clear lens shall be provided to illuminate the stepping surfaces one (1) each side of the top mount walkway.

Deck/Scene Light Wired to Back-Up Lights

The rear deck or scene lights shall be activated when the chassis is placed in reverse to provide additional lighting, in addition to the back-up lights, when backing the vehicle.

Deck Lights

Two (2) Whelen round 12 Super LED model PFBP12C floodlights with black housing and chrome rear covers shall be installed at the rear of the apparatus. The rear deck lights shall be switched with the work light switch in the cab.

Location: (1) each side on stanchions inboard of warning lights.

Scene Lights

Two (2) Whelen model M6ZC series Linear Super LED clear scene lights shall be provided.

Each shall have Linear Super LED diodes with internal light deflecting optics. The internal light deflecting optics shall redirect the light without the use of angle brackets.

The lights shall be located (1) each side at rear of body as high as possible, and (1) each side of cab behind front cab doors as high as possible. Each light shall be controlled by a switch in cab accessible to driver.

Hosebed Light

A Whelen LED light model PFBP12C shall be installed at the front area of the hosebed to provide hosebed lighting per current NFPA 1901. The hosebed light shall be switched with work light switch in the cab.

Engine Compartment Light

There shall be lighting provided in compliance with NFPA to illuminate the engine compartment area.

Pump Compartment LED Light

An LED light shall be provided in the pump compartment area for NFPA compliance. The light shall be wired to operate with the work light switch in the cab.

Pump Panel Lighting Package - Top Mount

Pump panel lighting shall be provided for a top mount pump module in accordance with NFPA.

The top mount control panel shall have three (3) LED lights mounted above the operator`s control panel.

The driver side pump control panel shall have one (1) LED light mounted under a protective cover that is above the driver side pump panel. The officer side shall have one (1) LED light mounted under a protective cover that is above the officer side pump panel.

The lights shall be activated by the work light switch in the cab when the park brake is set.

Door Ajar Alarm

An audible alarm shall be mounted in the cab interior and wired into the door ajar or indicator.

Foot Switches

A heavy duty metal floor mounted foot switch shall be installed to operate the Q2B siren. It shall be located driver's side, officer's side.

Back-Up Camera

A Safety Vision back-up camera model SV-625B-Kit with a color monitor model SV-CLCD70BA shall be installed. The monitor shall be installed on the front console area visible at night and in bright sunlight to the driver. The camera shall be mounted up high at the rear of the vehicle to provide a wide angle rear view with audio. The system shall include a cable with metallic waterproof threaded o-ring seal connectors to ensure positive connection between video cable and camera to prevent unplugging due to vibration resulting in video loss to vehicle operator.

Back-Up Alarm

An electronic back-up alarm shall be supplied. The 97 dB alarm shall be wired into the chassis back-up lights to signal when the vehicle is in reverse gear.

12 Volt DC Power Distribution Module

There shall be a 12 place 12 volt DC power distribution module installed as specified.

The module will have six (6) circuits wired directly to the battery and have six (6) circuits wired through the master battery switch with 12 positions for grounds. Connection to the power module circuit will be through a .250 female spade connector. Each buss will be protected with a 50 amp circuit breaker for overload protection. The module will accept ATC blade type fuses or 22X series circuit breakers.

The module shall be located behind officer's seat.

10KW Hydraulic Generator

An Onan 10KW side draft hydraulic generator, model 10RBAB, shall be provided and installed dunnage pan offset to officer side.

The unit shall come equipped with: modular generator unit (which includes the hydraulic motor and filter, generator, and cooler), variable displacement hydraulic pump, hydraulic reservoir and a gauge panel.

The gauge panel shall display voltage, hour meter, frequency, and amperage.

The hydraulic motor, generator, blower, cooler, and necessary hydraulic components are enclosed in a stainless steel housing. The housing is lined with acoustical material to reduce noise levels.

The modular generator unit shall be 32.00" long x 15.80" wide x 13.70" high and weigh approximately 179 pounds.

The reservoir shall be mounted separately.

The hydraulic pump shall be driven by a chassis transmission mounted power take off (PTO).

A generator control / PTO engage switch shall be mounted on the cab instrument panel to engage the PTO and start the generator.

Ratings and Capacity

Rating	10,000 watts continuous
Volts:	120/240 volts
Phase:	Single, 4 wire
Frequency:	60 Hz
Amperage:	83.30 amps @ 120 volts or 41.60 amps @ 240 volts
Engine speed at engagement:	Below 1000 RPM
Operation Range:	975 to 2500 RPM
	600 to 2500 RPM Aerial Only

The generator shall be tested operating at 100 percent of its name plate voltage for a minimum of 2 hours in accordance with current NFPA 1901 standards.

Notes
*All ratings and capacities shall be derived utilizing current NFPA 1901 test parameters.
*Extreme ambient temperatures could affect generator performance.

3rd Party Generator Testing

The generator shall be tested at the manufacturer`s facility by an independent, third-party testing service. The conditions and testing of the generator shall be as outlined in current NFPA 1901.

The test shall include operating the generator for two hours at 100% of the rated load. Power source voltage, amps, frequency shall be monitored. The prime mover`s oil pressure, water temperature, transmission temperature (if applicable) and power source hydraulic fluid temperature (if applicable) shall be monitored during testing.

The results of the test shall be recorded and provided with delivery documentation.

Generator Air Deflector

An air deflector to allow for exhausting up or down draft for an Onan hydraulic generator shall be provided on the air output side of the generator. The air deflector shall be constructed of stainless steel.

Circuit Breaker Panel

A twelve (12) place breaker box with up to twelve (12) appropriately sized ground-fault interrupter circuit breakers shall be supplied. The breaker box will include a master breaker sized according to the generator output. The breaker box will be located in the specified compartment, not to exceed 12` run of wire.

Note: If generator is 5.5KW or less, the main breaker will occupy 2 places, leaving 10 available.

Dimensions: 17.92" high x 14.25" wide x 3.75" deep.

Location: L1 back wall above offset forward area.

Cab Flood/Quartz Lights

A Whelen Pioneer Plus series 12v flood/spot light model PCP2AFSB dual panel light head shall be provided on a brow mount powder coated black. The lighthead shall feature solid-state circuitry, polarity protection and not moving parts

for the highest degree of reliability. The lighthead shall utilize metalized reflectors and patented Linear-LED technology to generate 7,000 usable lumens. The lighthead dimensions shall be 4.65"H x 13.93"W x 3.00"D.

The light shall be located driver and officer side front cab brow.

LED Light Tower

One (1) Will-Burt Powerlite model NS3.0-600WHL extendible lighting system shall be installed rear cab roof mounted side to side and hinged to driver. The lighting is provided by a Will-Burt 12 volt DC RPC directional lighting system with rotation and tilt quartz halogen lamps to provide total coverage. The tower pneumatically extends vertically up to 10 feet. The remote control unit allows you to operate all Night Scan functions and accurately aim for complete directional positioning. In addition, AutoStow, a one button command, automatically retracts, turns out the lights and stows the entire system to the compact horizontal transporting position.

• The operational envelope of the light mast shall be automatically illuminated whenever the mast is being raised, lowered with the required NFPA look-up light.

• The lighting system shall include four (4) 150 watt 120 volt Whelen Pioneer PFP2AC LED light fixtures with an output of 14,000 lumens each.

• One button adjustable AutoStow provides error-free convenience to retract and stow system and shut off the lights automatically when being stowed.

• Heavy duty aluminum and stainless steel weatherproof construction provides long life for components exposed to water and weather.

• A hand held pistol grip remote control on a 25 ft. cord controls the aiming of lights. The up/down switch and AutoStow switch, which allows for quick and accurate pointing of lights and raising of light tower and automatically shuts off the lights when being stowed. The control shall be located next to the breaker box.

• Full 360 degrees of lighting coverage provides complete lighting coverage of emergency or work scene.

The overall size of nested light tower shall be approximately 44-1/2" wide x 62-5/8" long x 11-5/8" high.

Light Tower Control Location

Relocate light tower controls in place of standard placement. Location: officer side upper corner of top mount pump panel.

Cab Receptacles

Two (2) 20 amp/110 volt 3-prong straight blade NEMA 5-20 duplex household receptacles with stainless steel cover plate shall be installed in a non-weather exposed area as specified by the department. The receptacle shall be wired to the inlet receptacle where it will have overcurrent protection from an external source.

Location: In cab driver side on 3 x 3 post rear facing just above engine cover, In cab officer side on 3 x 3 post rear facing just above engine cover.

Electric Cord Reel

Two (2) Hannay electric cord reel(s) (ECR 1616-17-18) shall be installed and located pump module storage pan officer side, pump module storage pan driver side.

The reel(s) shall include 200` of Yellow 10 gauge 3 conductor type SOWA cord. The cord shall be rated at 20 amps @ 110 volts. The end of the cord shall be terminated for the installation of a department required connector.

Cord Reel Rollers

Stainless steel cord reel rollers shall be installed and located through a panel.

The rollers shall be located driver side pump module in line with reel, officer side pump module in line with reel.

The rollers shall facilitate smooth removal of the electric cord.

Cord Reel Rewind Switch

A heavy duty rubber covered electric reel rewind button shall be installed driver side pump panel, officer side pump panel.

DOT Required Drive Away Kit

Three (3) triangular warning reflectors with carrying case shall be supplied to satisfy the DOT requirement.

Paint Break with Dip to Grille

The cab shall have a two-tone paint break. The break line shall be approximately 31.5 inches below the cab roof drip rail. The paint break shall include a dip down to the corners of the cab grille.

Un-Painted Pump/Pre-Connect Module(s)

All applicable pump application modules shall have a sanded finish (not painted job color). Includes upper and lower pump modules, crosswalk module and/or

speedlay/pre-connect module (as applicable). Rear mounted body/pump module shall be painted job color.

Paint Custom Cab

The apparatus cab shall be painted Sikkens FLNA1088 Yellow. The paint process shall meet or exceed current state regulations concerning paint operations. Pollution control shall include measures to protect the atmosphere, water, and soil. Contractor shall, upon demand, provide evidence that the manufacturing facility is in compliance with State EPA rules and regulations.

The aluminum cab exterior shall have no mounted components prior to painting to assure full coverage of metal treatments and paint to the exterior surfaces. Cab doors and any hinged smooth-plate compartment doors shall be painted separately to assure proper paint coverage on cab, door jambs and door edges.

Paint process shall feature Sikkens high solid LV products and be performed in the following steps:

- Corrosion Prevention - all aluminum surfaces shall be pre-treated with the Alodine 5700 conversion coating to provide superior corrosion resistance and excellent adhesion of the base coat.
- Sikkens Sealer/Primer LV - acrylic urethane sealer/primer shall be applied to guarantee excellent gloss hold-out, chip resistance and a uniform base color.
- Sikkens High Solid LVBT650 (Base coat) - a lead-free, chromate-free high solid acrylic urethane base coat shall be applied, providing excellent coverage and durability. A minimum of two (2) coats shall be applied.
- Sikkens High Solid LVBT650 (Clear coat) - high solid LV clear coat shall be applied as the final step in order to ensure full gloss and color retention and durability. A minimum of two (2) coats shall be applied.

Any location where aluminum is penetrated after painting, for the purpose of mounting steps, hand rails, doors, lights, or other specified components shall be treated at the point of penetration with a corrosion inhibiting pre-treatment (ECK Corrosion Control). The pre-treatment shall be applied to the aluminum sheet metal or aluminum extrusions in all locations where the aluminum has been penetrated. All hardware used in mounting steps, hand rails, doors, lights, or other specified components shall be individually treated with the corrosion inhibiting pre-treatment.

After the paint process is complete, the gloss rating of the unit shall be tested with a 20 degree gloss meter. Coating thickness shall be measured with a digital MIL gauge and the orange peel with a digital wave scan device.

Paint Cab Two-Tone Color

The upper section of the cab shall be painted FLNA4145 Black.

The paint process of the secondary cab color shall be the same as the primary color.

Paint Stainless Steel Body, FRP

Exterior Body Surfaces

FRP (fiber reinforced) panels shall be provided to overlay the stainless steel outer side of body panels that are not covered with aluminum treadplate. The FRP panels shall be painted as detailed under "Painting Information" and then installed on the body exterior.

Polished Surfaces

The vertical stainless steel Unistrut channels located on the exterior of the hose body side panels shall have a hand polished appearance.

The reinforcing edges of the hose body side panels and trailing edges of the beavertails (if equipped) shall have a machine sanded DA finish.

Polished stainless steel vertical corner trim scuff guards shall be installed on the outer front and rear body corners.

Painting Information

The final finishing of the vehicle shall be performed to the highest standards of the fire apparatus industry.

All removable components and accessories shall be fitted to the body and then removed prior to final finishing, ensuring paint has been applied under all components and accessories.

Care shall be taken during paint preparation to properly fill all surface imperfections. Welded seam areas shall be ground flush and metal finished. Bare metal surfaces shall be etched chemically to ensure proper adhesion. The primer shall be sanded to assure a smooth surface for painting.

The interior of all compartments shall have a machine sanded DA finish that shall not be painted. Compartment seams shall be sealed with a silver silicone caulk.

The interior of the hosebed shall be provided with a machine sanded DA finish that shall not be painted.

The body exterior shall be finish painted using Sikkens paint, color: FLNA1088 Yellow. Furnish one pint of touch-up paint, including hardener to match each of the exterior colors.

Cab Interior Paint

The interior of the cab shall be painted Zolatone gray #20-64. Prior to painting, all exposed interior metal surfaces shall be pretreated using a corrosion prevention system.

Lettering and Striping

Up to one hundred (100) encapsulated gold leaf letters, gold leaf chassis paint break stripe, and NFPA black scotchlite chassis/body stripe shall be applied per Fire Department design.

Rear Body 3M Diamond Grade Striping

Chevron style 3M Diamond Grade striping shall be provided on the rear of the apparatus. The stripes shall consist of 6" Red/Fluorescent Yellow Green alternating stripes in an "A" pattern. The striping shall be located on the rear facing extrusions, panels and doors inboard and outboard of the beavertails if applicable.

CHASSIS

Chassis provided shall be a new, tilt-type custom fire apparatus. The chassis shall be manufactured in the apparatus body builder's facility eliminating any split responsibility. The chassis shall be designed and manufactured for heavy-duty service, with adequate strength, capacity for the intended load to be sustained, and the type of service required. The chassis shall be the manufacturer's heavy-duty line tilt cab.

MAXIMUM OVERALL HEIGHT

The maximum overall height of the apparatus shall be 9' 6" (114").

MAXIMUM OVERALL LENGTH

The maximum overall length of the apparatus shall be 34'.

WHEELBASE

The wheelbase of the vehicle shall be no greater than 227.00".

GVW RATING

The gross vehicle weight rating shall be a minimum of 53,800 lbs.

FRAME

The chassis frame shall be built with two (2) steel channels bolted to five (5) cross members or more, depending on other options of the apparatus.

The side rails shall have a 13.38" tall web over the front and mid sections of the chassis, with a continuous smooth taper to 10.75" over the rear axle.

Each rail shall have a section modulus of 25.992 cubic inches and a resisting bending moment (rbm) of 3,119,040 in-lb over the critical regions of the frame assembly, with a section modulus of 18.96 cubic inches with an rbm of 2,275,200 in-lb over the rear axle.

The frame rails shall be constructed of 120,000 psi yield strength heat-treated 0.38" thick steel with 3.50" wide flanges.

FRAME REINFORCEMENT

In addition, a mainframe inverted "L" liner shall be provided. It shall be heat-treated steel measuring 12.00" x 3.00" x 0.25". Each liner shall have a section modulus of 7.795 cubic inches, yield strength of 110,000 psi, and rbm of 857,462 in-lb. Total rbm at wheelbase center shall be 3,976,502 in-lb.

The frame liner shall be mounted inside of the chassis frame rail and extend the full length of the frame.

FRONT AXLE

The front axle shall be a reverse "I" beam type with inclined king pins. It shall be a Dana®, model D2200 with a rated capacity of 23,000 pounds.

The turning angle shall be 39 degrees to the right and 45 degrees to the left.

Highly specialized options may limit the cramp.

A viewing window shall be provided on each side of the axle for checking the oil level.

FRONT SUSPENSION

Front springs shall be a heavy-duty, taper leaf design, 54.00" long by 4.00" wide, with a ground rating of 23,000 pounds.

Kaiser spring pins shall be provided with double "figure-eight" grease grooves and a layer of electroless nickel plating, 1.0 mil thick around the entire pin. The bushing that holds the spring pin in place shall also have a grease groove.

SHOCK ABSORBERS

Monroe® Gas-Magnum® 65 heavy-duty telescoping shock absorbers shall be provided on the front axle.

FRONT OIL SEALS

Oil seals with viewing window shall be provided on the front axle.

FRONT TIRES

Front tires shall be Goodyear 385/65R22.50 radials, 20 ply G296 tread, rated for 24,400 lb maximum axle load and 68 mph maximum speed.

The tires shall be mounted on Alcoa© 22.50" x 12.25" Dura-Bright® polished aluminum disc type wheels with a ten (10) stud, 11.25" bolt circle.

REAR AXLE

The rear axle shall be Meritor™, Model RS-30-185, with a capacity of 31,000 lb.

TOP SPEED OF VEHICLE

A rear axle ratio shall be furnished to allow the vehicle to reach a top speed of 65 MPH.

REAR SUSPENSION

The rear springs shall be Standens semi-elliptical, 3.00" x 52.00", 11 leaves main with a ground rating of 31,000 lb. Spring hangers shall be castings with provisions for lubrication. The grease fittings shall be 90 degree type and shall be accessible

without removing the wheels or cutting any sheet metal. Two (2) top leaves shall wrap the forward spring hanger pin and the top leaf shall wrap the rear spring hanger pin on both the front and rear suspensions.

Kaiser spring pins shall be provided, with double "figure-eight" grease grooves and a layer of electroless nickel plating, 1.00 mil thick, around the entire pin. The bushing that holds the spring pin in place shall also have a grease groove.

REAR OIL SEALS
Oil seals shall be provided on the rear axle.

REAR TIRES
Rear tires shall be four (4) Goodyear 315/80R22.50 radials, 20 ply. G291, rated for 33,080 lb maximum axle load and 68 mph maximum speed.

The tires shall be mounted on Alcoa© 22.50" x 9.00" Dura-Bright® aluminum disc wheels with a ten (10) stud, 11.25" bolt circle.

A set of roller chains for the rear tires shall be supplied.

TIRE BALANCE
All tires shall be balanced with Counteract balancing beads. The beads shall be inserted into the tire and eliminate the need for wheel weights.

TIRE PRESSURE MANAGEMENT
There shall be a RealWheels LED AirSecure™ tire alert pressure management system provided, that shall monitor each tire's pressure. A sensor shall be provided on the valve stem of each tire for a total of six (6) tires.

The sensor shall calibrate to the tire pressure when installed on the valve stem for pressures between 10 and 200 psi. The sensor shall activate an integral battery operated LED when the pressure of that tire drops 5 to 8 psi.

Removing the cap from the sensor shall indicate the functionality of the sensor and battery. If the sensor and battery are in working condition, the LED shall immediately start to flash.

AUTOMATIC TIRE CHAINS
One (1) pair of Onspot automatic tire chains shall be provided at the rear. System shall be electric over air operated with locking switch on cab instrument panel. System to be operable at speeds up to 35 mph.

CHROME LUG NUT COVERS
Chrome lug nut covers shall be supplied on front and rear wheels.

MUD FLAPS
Mud flaps shall be installed behind the front and rear wheels of the apparatus.

WHEEL CHOCKS
There shall be one (1) pair of folding Ziamatic, Model SAC-44-E, aluminum alloy, Quick-Choc wheel blocks with easy-grip handle provided.

WHEEL CHOCK BRACKETS
There shall be one (1) pair of Zico, Model SQCH-44-H, horizontal mounting wheel chock brackets provided for the Ziamatic, Model SAC-44-E, folding wheel chocks. The brackets shall be made of aluminum and consist of a quick release spring loaded rod to hold the wheel chocks in place. The brackets shall be mounted under drivers side front compartment.

ELECTRONIC STABILITY CONTROL
A vehicle control system shall be provided as an integral part of the ABS brake system from Meritor Wabco.

The system shall monitor and update the lateral acceleration (cornering) of the vehicle and compare it to a critical threshold where a side roll event may occur. If the critical threshold is met, the vehicle control system shall automatically reduce engine RPM, engage the engine retarder (if equipped), and selectively apply brakes to the individual wheel ends of the front and rear axles to reduce the possibility of a side roll event.

The system shall monitor directional stability through an electronic lateral accelerometer, steer angle sensor and yaw rate sensor. If spinout or drift out is detected, the vehicle control system shall selectively apply brakes to the individual wheel ends of the front and rear axles to assist in bringing the vehicle back to its intended direction. The operator shall continue to provide steering input in the desired direction as the system compensates.

Electronic Stability Control is not a guarantee that a side roll event, spinout or drift out shall not occur. ESC is a supplemental safety system that shall be used in conjunction with safe driving habits.

ANTI-LOCK BRAKE SYSTEM
The vehicle shall be equipped with a Wabco 4S4M, anti-lock braking system. The ABS shall provide a four (4) channel anti-lock braking control on both the front and rear wheels. A digitally controlled system that utilizes microprocessor technology shall control the anti-lock braking system. Each wheel shall be monitored by the system. When any wheel begins to lockup, a signal shall be sent to the control unit.

This control unit shall then reduce the braking of that wheel for a fraction of a second and then reapply the brake. This anti-lock brake system shall eliminate the lockup of any wheel thus helping to prevent the apparatus from skidding out of control.

AUTOMATIC TRACTION CONTROL

An anti-slip feature shall be included with the ABS. The Automatic Traction Control shall be used for traction in poor road and weather conditions. The Automatic Traction Control shall act as an electronic differential lock that shall not allow a driving wheel to spin, thereby supplying traction at all times. The ABS electronic control unit (ECU) shall work with the engine ECU, sharing information concerning wheel slip. Engine ECU shall use information to control engine speed, allowing only as much throttle application as required for the available traction, regardless of how much the driver is asking for. A "mud/snow" switch shall be provided on the instrument panel. Activation of the switch shall allow additional tire slip to let the truck climb out and get on top of deep snow or mud.

BRAKES

The service brake system shall be full air type by Bendix®.

Front brakes shall be Model ADB22X™, disc type with automatic pad wear adjustment and 17.00" rotors for improved stopping distance.

The rear brakes shall be Meritor™ 16.50" x 8.63" cam operated with automatic slack adjusters.

BRAKE SYSTEM AIR COMPRESSOR

The air compressor shall be a Cummins/WABCO with 18.7 cubic feet per minute output.

BRAKE SYSTEM

The brake system shall include:

- Bendix® dual brake treadle valve with vinyl covered foot surface
- Heated automatic moisture ejector on air dryer
- Total air system capacity of 5,198 cubic inches
- Two (2) air pressure gauges with a red warning light and an audible alarm, that activates when air pressure falls below 60 psi
- Spring set parking brake system
- Parking brake operated by a push-pull style control valve
- A parking "brake on" indicator light on instrument panel

- Park brake relay/inversion and anti-compounding valve, in conjunction with a double check valve system, with an automatic spring brake application at 40 psi
- A pressure protection valve to prevent all air operated accessories from drawing air from the air system when the system pressure drops below 80 psi (550 kPa)

The air tank shall be primed and painted to meet a minimum 750 hour salt spray test.

To reduce the effects of corrosion, the air tank shall be mounted with stainless steel brackets (no exception).

BRAKE SYSTEM AIR DRYER

The air dryer shall be WABCO System Saver 1200 with spin-on coalescing filter cartridge and 100 watt heater.

BRAKE LINES

Color-coded nylon brake lines shall be provided. The lines shall be wrapped in a heat protective loom where necessary in the chassis.

AIR INLET WITH AUTOMATIC EJECT

One (1) air inlet with Kussmaul Air Eject shall be provided. It shall allow station air to be supplied to the apparatus brake system through a shoreline hose. The inlet shall automatically disconnect the air line when the truck is started. It shall be equipped with a male coupling and be located in the driver side lower step well of cab. A check valve shall be provided to prevent reverse flow of air. The inlet shall discharge into the "wet" tank of the brake system. A mating female coupling shall also be provided with the loose equipment.

ENGINE

The chassis shall be powered by an electronically controlled engine as described below:

Make:	Cummins®
Model:	ISX12
Power:	500 hp at 1800 rpm
Torque:	1645 lb-ft at 1200 rpm
Governed Speed:	2100 rpm
Emissions Level:	EPA 2015
Fuel:	Diesel

Cylinders:	Six (6)
Displacement:	729 cubic inches (11.9L)
Starter:	Delco 39MT™
Fuel Filters:	Spin-on style primary filter with water separator and water-in-fuel sensor. Secondary spin-on style filter.
Coolant Filter:	Engine mounted spin-on style with shut off valve

The engine shall include On-board diagnostics (OBD), which provides self diagnostic and reporting. The system shall give the owner or repair technician access to state of health information for various vehicle sub systems. The system shall monitor vehicle systems, engine and after treatment. The system shall illuminate a malfunction indicator light on the dash console if a problem is detected.

HIGH IDLE

A high idle switch shall be provided, inside the cab, on the instrument panel, that shall automatically maintain a preset engine rpm. A switch shall be installed, at the cab instrument panel, for activation/deactivation.

The high idle shall be operational only when the parking brake is on and the truck transmission is in neutral. A green indicator light shall be provided, adjacent to the switch. The light shall illuminate when the above conditions are met. The light shall be labeled "OK to Engage High Idle."

ENGINE BRAKE

A Jacobs® engine brake is to be installed with the controls located on the instrument panel within easy reach of the driver.

The driver shall be able to turn the engine brake system on/off and have a high, medium and low setting.

The engine brake shall activate when the system is on and the throttle is released.

The high setting of the brake application shall activate and work simultaneously with the variable geometry turbo (VGT) provided on the engine.

The engine brake shall be installed in such a manner that when the engine brake is slowing the vehicle the brake lights are activated.

The ABS system shall automatically disengage the auxiliary braking device, when required.

CLUTCH FAN
A Horton® fan clutch shall be provided. The fan clutch shall be automatic when the pump transmission is in "Road" position, and fully engaged in "Pump" position.

MAGNETIC ENGINE OIL DRAIN PLUG
A magnetic drain plug shall be installed in the engine oil pan in place of the standard drain plug.

ENGINE AIR INTAKE
The air intake with an ember separator shall be mounted high on the passenger side of the cab, to the front of the crew cab door. The ember separator is designed to prevent road dirt and recirculating hot air from entering the engine.

The ember separator shall be easily accessible through a hinged stainless steel grille, with one (1) flush quarter turn latch.

EXHAUST SYSTEM
The exhaust system shall include a diesel particulate filter (DPF) and a selective catalytic reduction (SCR) device to meet current EPA standards. The exhaust system shall be stainless steel from the turbo to the inlet of the SCR device and shall be 5.00" in diameter. An insulation wrap shall be provided on all exhaust pipes between the turbo and SCR to minimize the transfer of heat to the cab. The exhaust shall terminate horizontally ahead of the passenger side rear wheels. A tailpipe diffuser shall be provided to reduce the temperature of the exhaust as it exits. Heat deflector shields shall be provided to isolate chassis and body components from the heat of the tailpipe diffuser.

EXHAUST MODIFICATION
The exhaust pipe shall be 90 degrees to the body.

The diffuser shall be reduced to 5.00" in the center to accommodate the fire department's air recovery system. The 5.00" extension pipe coming out of the end of the diffuser shall be flush with the body rub rail. There shall be a minimum of 4.00" clearance between the top of the 5.00" extension and the bottom of the body.

There shall be a minimum of 2.50" from the exhaust pipe to the under side of the body heat shield. The last 7.00" of the exhaust shall be free of hangers and/or clamps.

EXHAUST MODIFICATION
The exhaust pipe shall be brought out from under the body at a 90 degree angle from the truck. The tail pipe shall extend a minimum of 2.00" past the body,

adaptable for the Plymovent system. The diameter of the pipe shall be 7.00". There shall be a clearance of 4.00" completely around the pipe once past the side of the body. A stop shall be provided on the tail pipe that shall prevent the nozzle from sliding too far on.

RADIATOR

The radiator and the complete cooling system shall meet or exceed NFPA and engine manufacturer cooling system standards.

For maximum cooling performance, the radiator core shall be made of copper fins having a serpentine design, soldered to brass tubes. The tubes shall be welded to brass headers using the patented Beta-Weld process for increased strength, longer road life and solder-bloom corrosion protection. The radiator core shall have a minimum frontal area of 1,396 square inches. Steel supply and return tanks shall be bolted to the core headers and steel side channels to complete the radiator assembly. The radiator shall be compatible with commercial antifreeze solutions.

The radiator shall be mounted in such a manner as to prevent the development of leaks caused by twisting or straining when the apparatus operates over uneven ground. The radiator assembly shall be isolated from the chassis frame rails with rubber isolators.

The radiator shall include an integral de-aeration tank, with a remote-mounted overflow tank. For visual coolant level inspection, the radiator shall have a built-in sight glass. The radiator shall be equipped with a 15 psi pressure relief cap.

A drain port shall be located at the lowest point of the cooling system and/or the bottom of the radiator to permit complete flushing of the coolant from the system.

A heavy-duty fan shall draw in fresh, cool air through the radiator. Shields or baffles shall be provided to prevent recirculation of hot air to the inlet side of the radiator.

COOLANT LINES

Gates® silicone hoses shall be used for all engine/heater coolant lines installed by the chassis manufacturer.

The chassis manufacturer shall also use Gates brand hose on other heater, defroster and auxiliary coolant circuits. There shall be some areas in which an appropriate Gates product is not available. In those instances a comparable silicone hose from another manufacturer shall be used.

Hose clamps shall be stainless steel constant torque type to prevent coolant leakage. They shall react to temperature changes in the cooling system and expand or contract accordingly while maintaining a constant clamping pressure on the hose.

FUEL TANK

A 75 gallon fuel tank shall be provided and mounted at rear of chassis. The tank shall be constructed of 12-gauge, hot rolled steel. It shall be equipped with swash partitions and a vent. To eliminate the effects of corrosion, the fuel tank shall be mounted with stainless steel straps. (no exception).

A .75" drain plug shall be provided in a low point of the tank for drainage.

A fill inlet shall be located on the left hand side of the body and be covered with a hinged, spring loaded, stainless steel door that is marked "Ultra Low Sulfur - Diesel Fuel Only."

A .50" diameter vent shall be provided running from top of tank to just below fuel fill inlet.

The tank shall meet all FHWA 393.67 requirements including a fill capacity of 95 percent of tank volume.

All fuel lines shall be provided as recommended by the engine manufacturer.

DIESEL EXHAUST FLUID TANK

A 5 gallon diesel exhaust fluid (DEF) tank shall be provided and mounted in the driver's side body rearward of the rear axle.

A 0.50" drain plug shall be provided in a low point of the tank for drainage.

A fill inlet shall be provided and marked "Diesel Exhaust Fluid Only". The fill inlet shall be located adjacent to the engine fuel inlet behind a common hinged, spring loaded, polished stainless steel door on the driver side of the vehicle.

The selector flap within the common area for the fuel and DEF fills shall have a flush lift & turn latch. The latch shall be provided so that the selector flap will be latched when the flap is in the position over the DEF fill.

The tank shall meet the engine manufacturers requirement for 10 percent expansion space in the event of tank freezing.

The tank shall include an integrated heater unit that utilizes engine coolant to thaw the DEF in the event of freezing.

FUEL COOLER
An air to fuel cooler shall be installed in the engine fuel return line.

FUEL SEPARATOR
The engine shall be equipped with a Racor in-line spin-on fuel and water separator in addition to the engine fuel filters.

TRANSMISSION
An Allison 5th generation, Model EVS 4000P, electronic, torque converting, automatic transmission shall be provided.

The transmission shall be equipped with prognostics to monitor oil life, filter life, and transmission health. A wrench icon on the shift selector's digital display shall indicate when service is due.

Two (2) PTO openings shall be located on left side and top of converter housing (positions 8 o'clock and 1 o'clock).

A transmission temperature gauge with red light and buzzer shall be installed on the cab instrument panel.

TRANSMISSION SHIFTER
A six (6)-speed push button shift module with the 4 + 2 "Mode" button shall be mounted to right of driver on console. Shift position indicator shall be indirectly lit for after dark operation.

The Allison shifter shall be a "double-digit" display model.

The transmission ratio shall be 1st - 3.51 to 1.00, 2nd - 1.91 to 1.00, 3rd - 1.43 to 1.00, 4th - 1.00 to 1.00, 5th - 0.75 to 1.00, 6th - 0.64 to 1.00, R- 4.80 to 1.00.

TRANSMISSION COOLER
A Champ® shell and tube transmission oil cooler shall be provided using engine coolant to control the transmission oil temperature. The cooler shall have an aluminum shell and copper tubes. The cooler shall be assembled using two (2) pressed in rubber tube sheets (one on each end), creating a reliable mechanical seal between the coolant and the oil. No brazed, soldered, or welded connections shall be used to separate the coolant from the oil.

DRIVELINE
Drivelines shall be a heavy-duty metal tube and be equipped with Spicer® 1810 universal joints.

The shafts shall be dynamically balanced before installation.

A splined slip joint shall be provided in each driveshaft. The slip joint shall be coated with Glidecoat® or equivalent.

STEERING

A Ross, Model TAS-85, steering gear, with integral heavy-duty power steering, shall be provided. For reduced system temperatures, the power steering shall incorporate an air to oil cooler and an Eaton, Model VN20, hydraulic pump with integral pressure and flow control. All power steering lines shall have wire braded lines with crimped fittings.

A tilt and telescopic steering column shall be provided to improve fit for a broader range of driver configurations.

STEERING ASSIST CYLINDER ON FRONT AXLE

The front axle shall be equipped with a Ross power assist cylinder to aid in the steering of the apparatus.

STEERING WHEEL

The steering wheel shall be 18.00" in diameter, have tilting and telescoping capabilities, and a 4-spoke design.

LOGO AND CUSTOMER DESIGNATION ON DASH

The dash panel shall have an emblem containing the fire apparatus manufacturer's logo and customer name. The emblem shall have three (3) rows of text for the customer's department name. There shall be a maximum of eight (8) characters in the first row, 11 characters in the second row and 11 characters in the third row.

The first row of text shall be: Haddam

The second row of text shall be: Volunteer

The third row of text shall be: Fire Company

BUMPER

A one (1)-piece bumper manufactured from .25" formed steel with a .38" bend radius shall be provided. The bumper shall be a minimum of 10.00" high with a 1.50" top and bottom flange, and shall extend 22.00" from the face of the cab. The bumper shall be 95.28" wide with 45 degree corners and side plates. The bumper shall be metal finished and painted gloss black in color.

To provide adequate support strength, the bumper shall be mounted directly to the front of the C channel frame. The frame shall be a bolted modular extension frame constructed of 50,000 psi tensile steel.

GRAVEL PAN

A gravel pan, constructed of bright aluminum treadplate, shall be furnished between the bumper and the cab face. The pan shall be properly supported from the underside to prevent flexing and vibration.

HOSE TRAY

A hose tray constructed of aluminum shall be placed in the center of the bumper extension. The tray shall be 16.00" deep, starting with a 3.00" lip above the bumper and 13.00" below.

The tray shall have a capacity of up to 200' of 1.75" double jacket hose.

The top edge of the riser shall be trimmed with round aluminum extrusion. The forward edge shall be angled forward approximately 45 degrees for ease of hose deployment.

Aluminum grating shall be provided at the bottom of the tray. Drain holes are also provided.

GRAVEL PAN

A gravel pan, constructed of bright aluminum treadplate, shall be furnished between the bumper and cab face.

The gravel pan shall be properly supported from the underside to prevent flexing and vibration of the aluminum treadplate.

HOSE TRAY COVER

A bright aluminum treadplate cover shall be provided over the center hose tray.

The cover shall be "notched" allowing the hose to be pre connected to hose connection.

The cover shall be attached with a stainless steel hinge.

Two (2) flush lift and turn latch shall secure the cover in the closed position and a pneumatic stay arm on each side shall hold the cover in the open position.

LIFT AND TOW MOUNTS

Mounted to the frame extension shall be lift and tow mounts. The lift and tow mounts shall be designed and positioned to adapt to certain tow truck lift systems.

The lift and tow mounts with eyes shall be painted the same color as the frame.

TOW HOOKS

No tow hooks are to be provided. This truck shall be equipped with a lift and tow package with integral tow eyes.

CAB

The cab shall be designed specifically for the fire service and shall be manufactured by the chassis builder.

The cab shall be built by the apparatus manufacturer in a facility located on the manufacturer's premises (no exception).

For reasons of structural integrity and enhanced occupant protection, the cab shall be of heavy duty design, constructed to the following minimal standards.

The cab shall have 12 main vertical structural members located in the A-pillar (front cab corner posts), B-pillar (side center posts), C-pillar (rear corner posts) and rear wall areas. The A-pillar shall be constructed of solid A356-T5 aluminum. The B-pillar and C-pillar shall be constructed from 0.25" heavy wall extrusions. The rear wall shall be constructed of two (2) 4.00" x 2.00" outer aluminum extrusions and two (2) 3.00" x 2.00" inner aluminum extrusions. All main vertical structural members shall run from the floor to 6.50" x 4.875" x 0.1875" thick roof extrusions to provide a cage-like structure with the A-pillar and roof extrusions being welded into a 0.36" thick corner casting at each of the front corners of the roof assembly.

The front of the cab shall be constructed of a 0.25" thick gusset plate, covered with a 0.090" front skin (for a total thickness of 0.34"), and reinforced with a 95.00" wide x 11.13" deep x 0.50" thick cross-cab support located just below the windshield. The cross-cab support shall run the full width of the cab and weld to each A-pillar, the 0.25" thick gusset plate and the front skin.

The cab floors shall be constructed of 0.1875" thick aluminum plate and reinforced at the firewall with an additional 0.50" thick cross-floor support providing a total thickness of 0.6875" of structural material at the front floor area. The front floor area shall also be supported with one (1) 0.50" plate bolted to one (1) 0.78" plate that also provides the mounting point for the cab lift. This tubing shall run from the front of the cab to the 0.187" thick engine tunnel, creating the structure to support the forces created when lifting the cab.

The cab shall be 94.75" wide (outside door skin to outside door skin) to maintain maximum maneuverability (no exception).

The forward cab section shall have an overall height (from the cab roof to the ground) of approximately 103.00". The crew cab section shall have a 10.00" raised roof, with an overall cab height of approximately 113.00". The overall height listed shall be calculated based on a truck configuration with the lowest suspension weight ratings, the smallest diameter tires for the suspension, no water weight, no loose equipment weight, and no personnel weight. Larger tires, wheels, and suspension shall increase the overall height listed.

The floor to ceiling height inside the crew cab shall be 64.00" in the center and 69.25" in the outboard positions.

The crew cab floor shall measure 40.12" from rear wall to the back side of engine tunnel.

The engine tunnel, at the rearward highest point (knee level), shall measure 47.75" to the back wall.

The crew cab shall be of the totally enclosed design with access doors constructed in the same manner as the driver and passenger doors.

The cab shall be a full tilt cab style.

A 3-point cab mount system with rubber isolators shall improve ride quality by isolating chassis vibrations from the cab.

INTERIOR CAB INSULATION

The cab shall include 1.50" insulation in the ceiling and side walls, and 2.00" insulation in the rear wall to maximize acoustic absorption and thermal insulation.

FENDER LINERS

Full circular inner fender liners in the wheel wells shall be provided.

WINDSHIELD

A curved safety glass windshield shall be provided with over 2,754 square inches of clear viewing area. The cab windshield shall have bright trim inserts in the rubber molding holding the glass in place. Economical windshield replacement glass shall be readily available from local auto glass suppliers.

All cab glass shall be tinted.

WINDSHIELD WIPERS

Two (2) electric windshield wipers with washer shall be provided that meet FMVSS and SAE requirements.

The washer reservoir shall be able to be filled without raising the cab.

GLOVE BOX

A glove box with a drop-down door shall be installed in the front dash panel in front of the officer's position.

CAB REAR WALL EXTERIOR COVERING

The exterior surface of the rear wall of the cab shall be overlaid with bright aluminum treadplate except for areas that are not typically visible when the cab is lowered.

CAB LIFT

A hydraulic cab lift system shall be provided consisting of an electric powered hydraulic pump, dual lift cylinders, and necessary hoses and valves.

The hydraulic pump shall have a manual override for backup in the event of electrical failure.

Lift controls shall be on a panel located on the pump panel or front area of the body in a convenient location.

In addition to the panel controls, a 15' remote control shall be provided for raising and lowering the cab. The remote control shall be stored in the cab. The receptacle for the remote control shall be located next to the master controls on the panel.

The engine shall be easily accessible and capable of being removed with the cab tilted. The cab shall be capable of tilting 45 degrees and 90 degrees with crane assist.

Cab shall be locked down by a two (2)-point automatic spring-loaded hook mechanism that actuates after the cab has been lowered.

The hydraulic cylinders shall be equipped with a velocity fuse that protects the cab from accidentally descending when the control is located in the tilt position.

For increased safety, a redundant mechanical stay arm shall be provided that must be manually put in place on the driver side between the chassis and cab frame when cab is in the raised position. This device shall be manually stowed to its original position before the cab can be lowered.

Cab Lift Interlock

The cab lift system shall be interlocked to the parking brake. The cab tilt mechanism shall be active only when the parking brake is set and the ignition switch is in the on position. If the parking brake is released, the cab tilt mechanism shall be disabled.

GRILLE

A bright finished aluminum mesh grille screen, inserted behind a bright finished grille surround, shall be provided on the front center of the cab.

SIDE OF CAB MOLDING

Chrome molding shall be provided on both sides of cab.

MIRRORS

A Velvac®, Model 2010, west coast mirror shall be mounted on each side of the front cab door. Mirror dimensions shall be 7.00" wide x 16.00" high, and shall be heated and motorized. The shell shall be bright annealed stainless steel.

Both mirrors shall be heated and have a remote control that is convenient to the driver.

CONVEX MIRRORS (HEATED)

An 8.00" diameter round convex mirror shall be installed below each west coast mirror head. These mirrors shall be heated with the control inside the cab.

DOORS (BARRIER STYLE)

To enhance entry and egress to the cab, the forward cab doors shall be a minimum of 37.50" wide x 61.75" high. The crew cab doors shall be located on the sides of the cab and shall be constructed in the same manner as the forward cab doors. The crew cab doors shall measure a minimum of 34.88" wide x 71.75" high.

The forward cab and crew cab doors shall be constructed of extruded aluminum with a nominal material thickness of 0.125". The exterior door skins shall be constructed from 0.090" aluminum.

A flush mounted, chrome plated paddle type door handle shall be provided on the exterior of each cab door. Each door shall also be provided with an interior flush paddle handle.

The cab doors shall be provided with both interior (rotary knob) and exterior (keyed) locks as required by FMVSS 206. The locks shall be capable of activating when the doors are open or closed. The doors shall remain locked if locks are activated when the doors are opened, then closed.

A full length, heavy duty, stainless steel, piano-type hinge with a 0.38" pin and 11-gauge leaf shall be provided on all cab doors. There shall be double automotive-type rubber seals around the perimeter of the door framing and door edges to ensure a weather-tight fit.

A chrome grab handle shall be provided on the inside of each cab and crew cab door.

The cab steps at each door location shall be located below the cab doors and shall be exposed to the exterior of the cab.

DOOR PANELS

There shall be a full height brushed stainless steel door panel installed on the inside of all cab doors. The cab door panels shall be removable without disconnecting door and window mechanisms.

ELECTRIC OPERATED CAB DOOR WINDOWS

All four (4) cab doors shall be equipped with electric operated windows with flush mounted automotive style switches.

The drivers side lower instrument panel shall also have four (4) controls, one (1) for each door window.

CAB STEPS

The forward cab and crew cab access steps shall be a full size two (2) step design to provide largest possible stepping surfaces for safe ingress and egress. The bottom steps shall be designed with a grip pattern punched into bright aluminum treadplate material to provide support, slip resistance, and drainage. The bottom steps shall be a bolt-in design to minimize repair costs should they need to be replaced. The forward cab steps shall be a minimum 24.75" wide, and the crew cab steps shall be 21.25" wide with an 8.00" minimum depth. The inside cab steps shall not exceed 18.00" in height and be limited to two (2) steps. Three (3) step entrance designs shall not be acceptable due to safety concerns. A slip-resistant handrail shall be provided adjacent to each cab door opening to assist during cab ingress and egress.

STEP LIGHTS

For reduced overall maintenance costs compared to incandescent lighting, there shall be four (4) white LED step lights provided. The lights shall be installed at each cab and crew cab door, one (1) per step. The lights shall be located in the driver side front doorstep, driver side crew cab doorstep, passenger side front doorstep and passenger side crew cab doorstep.

In order to ensure exceptional illumination, each light shall provide a minimum of 25 foot-candles (fc) covering an entire 15.00" x 15.00" square placed 10.00" below the light and a minimum of 1.5 fc covering an entire 30.00" x 30.00" square at the same 10.00" distance below the light.

The lights shall be activated when the adjacent door is opened.

FENDER CROWNS
Stainless steel fender crowns shall be installed at the cab wheel openings.

CREW CAB WINDOWS
One (1) fixed window with tinted glass shall be provided on each side of the cab, to the rear of the front cab door. The windows shall be sized to enhance light penetration into the cab interior. The windows shall measure 17.50" wide x 21.00" high.

The rear wall of the crew cab shall have two (2) windows, each being 11.29" wide x 17.95" high.

CAB INTERIOR
The left and right side dash and center console shall be a flat faced design to provide easy maintenance and shall be constructed out of painted aluminum.

The engine tunnel shall be padded and covered with 46 ounce leather grain vinyl resistant to oil, grease and mildew.

The headliner shall be installed in both forward and rear cab sections. Headliner material shall be vinyl. A sound barrier shall be part of its composition. Material shall be installed on aluminum sheet and securely fastened to interior cab ceiling.

Forward portion of cab headliner shall provide easy access for servicing electrical wiring or for other maintenance needs without removing the entire unit.

CAB INTERIOR UPHOLSTERY
The cab interior upholstery shall be black.

CAB INTERIOR PAINT
The cab interior metal surfaces shall be painted black, vinyl texture paint.

CAB FLOOR
The cab and crew cab floor areas shall be covered with Polydamp™ acoustical floor mat consisting of a black pyramid rubber facing and closed cell foam decoupler.

The top surface of the material has a series of raised pyramid shapes evenly spaced, which offer a superior grip surface. Additionally, the material has a 0.25" thick closed cell foam, for no water absorption, which offers a sound dampening material for reducing sound levels.

CAB DEFROSTER

There shall be a 41,000 BTU defroster in the cab located under the engine tunnel.

The defroster ventilation shall be built into the design of the cab dash instrument panel and shall be easily removable for maintenance.

The defroster shall have a 3-speed blower and temperature controls accessible to the driver and officer.

The defroster ducts shall be designed to provide maximum defrosting capabilities for the front cab windows.

CAB/CREW CAB HEATER

Two (2) auxiliary heaters with 32,000 BTU each shall be provided in the cab. The heaters shall have a 3-speed blower and temperature controls accessible to the driver and officer. There shall also be louvers located below the rear facing seat riser and below the driver and officer positions for airflow.

The heaters shall be mounted, one (1) within each rear facing seat riser.

AIR CONDITIONING

A high-performance, customized air conditioning system shall be furnished inside the cab and crew cab. A 19.10 cubic inch compressor shall be installed on the engine.

The air conditioning system shall be capable of cooling the average cab temperature from 100 degrees Fahrenheit to 75 degrees Fahrenheit at 50 percent relative humidity within 30 minutes. The cooling performance test shall be run only after the cab has been heat soaked at 100 degrees Fahrenheit for a minimum of 4 hours.

A roof-mounted condenser that meets and exceeds the performance specification shall be installed on the cab roof. Mounting the condenser below the cab or body would reduce the performance of the system and shall not be acceptable.

An evaporator unit that meets and exceeds the performance specification shall be installed in the cab, located in the center of the cab ceiling over the engine tunnel. The evaporator shall include two (2) high performance cores and plenums with multiple outlets, one (1) plenum directed to the front and one (1) plenum directed to the rear of the cab.

The evaporator unit shall be provided with adjustable air outlets strategically located to direct air flow to the driver, officer and crew cab area.

All hose used shall be class 1 type to reduce moisture ingression into the air conditioning system.

The air conditioner refrigerant shall be R-134A and shall be installed by a certified technician.

The air conditioner shall be controlled by a single electronic control panel. For ease of operation, the control panel shall include variable adjustment for temperature and fan control and be conveniently located on the dash in clear view of the driver. The control panel shall include robust knobs for both fan speed and temperature adjustment.

SUN VISORS

Two (2) smoked Lexan™ sun visors provided. The sun visors shall be located above the windshield with one (1) mounted on each side of the cab.

There shall be no retention bracket provided to help secure each sun visor in the stowed position.

GRAB HANDLE

A black rubber covered grab handle shall be mounted on the lower portion of the driver's side cab entrance to assist in entering the cab. The grab handle shall be securely mounted to the post area between the door and steering wheel column.

A long rubber grab handle shall be mounted on the dash board in front of the officer.

ENGINE COMPARTMENT LIGHTS

Two (2) Whelen, Model 20C0CDCR, LED engine compartment lights shall be installed under the engine hood. The lights shall be provided one (1) each left and right side of the cab .

Both of these lights shall be activated when the cab is raised.

ACCESS TO ENGINE DIPSTICKS

For access to the engine oil and transmission fluid dipsticks, there shall be a door on the engine tunnel, inside the crew cab. The door shall be on the rear wall of the engine tunnel, on the vertical surface. The door shall be 17.75" wide x 12.75" high and be flush with the wall of the engine tunnel.

The engine oil dipstick shall allow for checking only. The transmission dipstick shall allow for both checking and filling. An additional port shall be provided for filling the engine oil.

The door shall have a rubber seal for thermal and acoustic insulation. One (1) flush latch shall be provided on the access door.

SEATING CAPACITY

The seating capacity in the cab shall be six (6).

DRIVER SEAT

A seat shall be provided in the cab for the driver. The seat design shall be a cam action type, with air suspension. For increased convenience, the seat shall include a manual control to adjust the horizontal position (6.00" travel). The manual horizontal control shall be a towel-bar style located below the forward part of the seat cushion. To provide flexibility for multiple driver configurations, the seat shall have an adjustable reclining back. The seat back shall be a high back style with side bolster pads for maximum support. For optimal comfort, the seat shall be provided with 17.00" deep foam cushions designed with EVC (elastomeric vibration control).

The seat shall be furnished with a 3-point, shoulder type seat belt. The seat belt tongue shall be stored at waist position for quick application by the seat occupant. The seat belt receptacle shall be provided on a cable conveniently nested next to the seat cushion, providing easy accessibility. The seat belt shall be furnished with dual automatic retractors that shall provide ease of operation in the normal seating position.

OFFICER SEAT

A seat shall be provided in the cab for the passenger. The seat shall be a fixed type, with no suspension. For optimal comfort, the seat shall be provided with 17.00" deep foam cushions designed with EVC (elastomeric vibration control). To ensure safe operation, the seat shall be equipped with seat belt sensors in the seat cushion and belt receptacle that shall activate an alarm indicating a seat is occupied but not buckled.

The seat back shall be an SCBA back style with 5 degree fixed recline angle. The SCBA cavity shall be adjustable from front to rear in 1.00" increments, to accommodate different sized SCBA cylinders. Moving the SCBA cavity shall be accomplished by unbolting, relocating, and re-bolting it in the desired location.

The seat shall include the following features incorporated into the side roll protection system:

- Side air curtain shall be mounted integral to the outboard bolster of the seat back. The air curtain shall be covered by a decorative panel when in the stowed position.

- A seat safety system shall be included. When activated, this system shall pretension the seat belt.

The seat shall be furnished with a 3-point, shoulder type seat belt. The seat belt tongue shall be stored at waist position for quick application by the seat occupant. The seat belt receptacle shall be provided on a cable conveniently nested next to the seat cushion, providing easy accessibility. The seat belt shall be furnished with dual automatic retractors that shall provide ease of operation in the normal seating position.

RADIO COMPARTMENT

A radio compartment shall be provided under the officer's seat.

The inside compartment dimensions shall be 14.00" wide x 7.50" high x 14.50" deep.

A drop-down door with a chrome plated lift and turn latch shall be provided for access.

The compartment shall be constructed of smooth aluminum and painted to match the cab interior.

REAR FACING DRIVER SIDE OUTBOARD SEAT

There shall be one (1) rear facing seat provided at the driver side outboard position in the crew cab. For optimal comfort, the seat shall be provided with 15.00" deep foam cushions designed with EVC (elastomeric vibration control). To ensure safe operation, the seat shall be equipped with seat belt sensors in the seat cushion and belt receptacle that shall activate an alarm indicating a seat is occupied but not buckled.

The seat back shall be an SCBA back style with 5 degree fixed recline angle. The SCBA cavity shall be adjustable from front to rear in 1.00" increments, to accommodate different sized SCBA cylinders. Moving the SCBA cavity shall be accomplished by unbolting, relocating, and re-bolting it in the desired location.

The seat shall be furnished with a 3-point, shoulder type seat belt. The seat belt tongue shall be stored at waist position for quick application by the seat occupant. The seat belt receptacle shall be provided on a cable conveniently nested next to the seat cushion, providing easy accessibility. The seat belt shall be furnished with dual automatic retractors that shall provide ease of operation in the normal seating position.

REAR FACING PASSENGER SIDE OUTBOARD SEAT

There shall be one (1) rear facing seat provided at the passenger side outboard position in the crew cab. For optimal comfort, the seat shall be provided with 15.00" deep foam cushions designed with EVC (elastomeric vibration control). To ensure safe operation, the seat shall be equipped with seat belt sensors in the seat cushion and belt receptacle that shall activate an alarm indicating a seat is occupied but not buckled.

The seat back shall be an SCBA back style with 5 degree fixed recline angle. The SCBA cavity shall be adjustable from front to rear in 1.00" increments, to accommodate different sized SCBA cylinders. Moving the SCBA cavity shall be accomplished by unbolting, relocating, and re-bolting it in the desired location.

The seat shall be furnished with a 3-point, shoulder type seat belt. The seat belt tongue shall be stored at waist position for quick application by the seat occupant. The seat belt receptacle shall be provided on a cable conveniently nested next to the seat cushion, providing easy accessibility. The seat belt shall be furnished with dual automatic retractors that shall provide ease of operation in the normal seating position.

FORWARD FACING CENTER SEATS

There shall be two (2) forward facing flip-up seats provided at the center position in the crew cab. For optimal comfort, the seats shall be provided with 15.00" deep foam cushions designed with EVC (elastomeric vibration control). To ensure safe operation, the seats shall be equipped with seat belt sensors in the seat cushion and belt receptacle that shall activate an alarm indicating a seat is occupied but not buckled.

The seat back shall be an SCBA style with 90 degree back. The SCBA cavity shall be adjustable from front to rear in 1.00" increments, to accommodate different sized SCBA cylinders. Moving the SCBA cavity shall be accomplished by unbolting, relocating, and re-bolting it in the desired location.

The seats shall be furnished with three (3)-point, shoulder type seat belts. The seat belt tongue shall be stored at waist position for quick application by the seat occupant. The seat belt receptacle shall be provided on a cable conveniently nested next to the seat cushion, providing easy accessibility. The seat belts shall be furnished with dual automatic retractors that shall provide ease of operation in the normal seating position.

POK TOOL BOARD

There shall be a POK brand tool board mounted – floor to ceiling on either side of the forward facing seat on the rear wall.

SEAT UPHOLSTERY

All seat upholstery shall be black and black speckled Tuff-Tex material. The cab shall have six (6) seating positions.

AIR BOTTLE HOLDERS

All SCBA type seats in the cab shall have a Ziamatic brand, clamp style, SCBA holder mounted in each backrest. A remote lever release release shall be provided on each bracket in the center front of the bottom seat cushion..

This bracket shall accommodate all diameter bottles.

There shall be a quantity of six (6).

ACCESS DOORS

An access door shall be provided on both sides of the forward facing seat riser in crew cab in addition to the standard front access door. Doors shall be constructed out of same material as seat riser with one (1) 1/4 turn flush latch on each door.

SEAT BELTS

All seating positions in the cab and crew cab shall have red seat belts.

The belts shall also include the Ready Reach® D-loop assembly to the shoulder belt system. The Ready Reach feature adds an extender arm to the D-loop location placing the D-loop in a closer, easier to reach location.

SHOULDER HARNESS HEIGHT ADJUSTMENT

All seating positions furnished with 3-point shoulder type seat belts shall include a height adjustment. This adjustment shall optimize the belts effectiveness and comfort for the seated firefighter.

SEAT BELT MONITORING SYSTEM

A seat belt monitoring system (SBMS) shall be provided. The SBMS shall be capable of monitoring up to ten (10) seat positions indicating the status of each seat position with a green or red LED indicator as follows:

- Seat Occupied & Buckled = Green
- Seat Occupied & Unbuckled = Red
- No Occupant & Buckled = Red
- No Occupant & Unbuckled = Not Illuminated

Audible Alarm
The SBMS shall include an audible alarm that shall be activated when a red illumination condition exists and the parking brake is released, or a red illumination condition exists and the transmission is not in park.

CAB DOME LIGHTS

There shall be four (4) dual LED dome lights with black bezels provided. Two (2) lights shall be mounted above the inside shoulder of the driver and officer and two (2) lights shall be installed and located, one (1) on each side of the crew cab.

The color of the LED's shall be red and white.

The white LED's shall be controlled by the door switches and the lens switch.

The color LED's shall be controlled by the lens switch.

In order to ensure exceptional illumination, each white LED dome light shall provide a minimum of 10.1 foot-candles (fc) covering an entire 20.00" x 20.00" square seating position when mounted 40.00" above the seat.

OVERHEAD MAP LIGHTS

There shall be two (2) white halogen, round adjustable map lights installed in the cab:

- One (1) overhead in front of the driving position.
- One (1) overhead in front of the passenger's position.

Each light shall include a switch on the light housing.

The light switches shall be connected directly to the battery switched power.

PORTABLE HAND LIGHTS, PROVIDED BY FIRE DEPARTMENT

NFPA 1901, 2009 edition, section 5.8.3 requires two portable hand lights mounted in brackets fastened to the apparatus.

The hand lights are not on the apparatus as manufactured. The fire department shall provide and mount these hand lights.

HAND HELD SPOTLIGHT

There shall be one (1) spotlight provided which shall be a Whelen, Model P36HHS LED hand held spot light(s) installed adjacent to the officer. The light(s) shall be furnished with a coil cord and a stainless steel bracket mounting bracket.

CAB INSTRUMENTATION

The cab instrument panel shall include gauges, telltale indicator lamps, control switches, alarms, and a diagnostic panel. The function of the instrument panel controls and switches shall be identified by a label adjacent to each item. Actuation of the headlight switch shall illuminate the labels in low light conditions. Telltale indicator lamps shall not be illuminated unless necessary. The cab instruments and controls shall be conveniently located within the forward cab section, forward of the driver. The gauge assembly and switch panels are designed to be removable for ease of service and low cost of ownership.

GAUGES

The gauge panel shall include the following ten (10) black faced gauges with black bezels to monitor vehicle performance:

- Voltmeter Gauge (volts):
  - Low volts (11.8 VDC)
    - Amber telltale light on indicator light display with steady tone alarm
  - High volts (15.5 VDC)
    - Amber telltale light on indicator light display with steady tone alarm
- Engine Tachometer (RPM)
- Speedometer MPH
- Fuel Level Gauge (Empty - Full in fractions):
  - Low fuel (1/8 full)
    - Amber telltale light on indicator light display with steady tone alarm
- Engine Oil Pressure Gauge (PSI):
  - Low oil pressure to activate engine warning lights and alarms
    - Red telltale light on indicator light display with steady tone alarm
- Front Air Pressure Gauges (PSI):
  - Low air pressure to activate warning lights and alarm
    - Red telltale light on indicator light display with steady tone alarm
- Rear Air Pressure Gauges (PSI):
  - Low air pressure to activate warning lights and alarm
    - Red telltale light on indicator light display with steady tone alarm

- Transmission Oil Temperature Gauge (Fahrenheit):
  - High transmission oil temperature activates warning lights and alarm
    - Amber telltale light on indicator light display with steady tone alarm
- Engine Coolant Temperature Gauge (Fahrenheit):
  - High engine temperature activates an engine warning light and alarms
    - Red telltale light on indicator light display with steady tone alarm
- Diesel Exhaust Fluid Level Gauge (Empty - Full in fractions):
  - Low fluid (1/8 full)
    - Amber telltale light on indicator light display

INDICATOR LAMPS

To promote safety, the following telltale indicator lamps shall be located on the instrument panel in clear view of the driver. The indicator lamps shall be "dead-front" design that is only visible when active. The colored indicator lights shall have descriptive text or symbols.

The following amber telltale lamps shall be present:

- Low coolant
- Trac cntl (traction control) (where applicable)
- Check engine
- Check trans (check transmission)
- Air rest (air restriction)
- Driver door open
- Passenger door open
- Tower (tower raised) (where applicable)
- DPF (engine diesel particulate filter regeneration)
- HET (engine high exhaust temperature) (where applicable)
- ABS (antilock brake system)
- MIL (engine emissions system malfunction indicator lamp) (where applicable)
- Regen inhibit (engine emissions regeneration inhibit) (where applicable)
- Trans temp (transmission temperature)
- SRS (supplemental restraint system) fault (where applicable)
- DEF (low diesel exhaust fluid level)
- The following red telltale lamps shall be present:

- Ladder rack down
- Parking brake
- Stop engine

The following green telltale lamps shall be present:

- Left turn
- Right turn
- Battery on
- Ignition
- Aux brake (auxiliary brake engaged) (where applicable)

The following blue telltale lamps shall be present:

- High beam

ALARMS

Audible steady tone warning alarm: A steady audible tone alarm shall be provided whenever a warning message is present.

INDICATOR LAMP AND ALARM PROVE-OUT

A system shall be provided which automatically tests telltale indicator lights and alarms located on the cab instrument panel. Telltale indicators and alarms shall perform prove-out when the ignition switch is held in the up position for three (3) to five (5) seconds to ensure proper performance.

CONTROL SWITCHES

For ease of use, the following controls shall be provided immediately adjacent to the cab instrument panel within easy reach of the driver. All switches shall have backlit labels for low light applications.

Headlight/Parking light switch: A three (3)-position maintained rocker switch shall be provided. The first switch position shall deactivate all parking and headlights. The second switch position shall activate the parking lights. The third switch shall activate the headlights.

Panel back lighting intensity control switch: A variable voltage control switch shall be provided. The switch moved in the up direction increases the panel back lighting intensity to a maximum and the switch moved in a down direction decreases the panel back lighting intensity to a minimum level.

Ignition switch: A three (3)-position maintained/momentary rocker switch shall be provided. The first switch position shall deactivate vehicle ignition. The second switch position shall activate vehicle ignition. The third momentary position shall perform prove-out on the telltale indicators and alarms when the ignition switch is held in the up position for three (3) to five (5) seconds to ensure proper performance. A green indicator lamp is activated with vehicle ignition.

Engine start switch: A two (2)-position momentary rocker switch shall be provided. The first switch position is the default switch position. The second switch position shall activate the vehicle's engine. The switch actuator is designed to prevent accidental activation.

Hazard switch shall be incorporated into the steering column.

Turn signal arm: A self-canceling turn signal with high beam headlight controls.

Windshield wiper control shall have high, low, and intermittent modes.

Parking brake control: An air actuated push/pull park brake control.

Chassis horn control: Activation of the chassis horn control shall be provided through the center of the steering wheel.

CUSTOM SWITCH PANELS

The design of cab instrumentation shall allow for emergency lighting and other switches to be placed within easy reach of the operator, thus improving safety. There shall be positions for up to three (3) switch panels in the overhead console on the driver's side, up to five (5) switch panels in the engine tunnel console, and up to three (3) switch panels in the overhead console on the officer's side. All switches have backlit labels for low light applications.

High idle engagement switch: A maintained rocker switch with integral indicator lamp shall be provided. The switch shall activate and deactivate the high idle function. The "Ok To Engage High Idle" indicator lamp must be active for the high idle function to engage. A green indicator lamp integral to the high idle engagement switch shall indicate when the high idle function is engaged.

"Ok To Engage High Idle" indicator lamp: A green indicator light shall be provided next to the high idle activation switch to indicate that the interlocks have been met to allow high idle engagement.

Diesel particulate filter regeneration switch (where applicable).

Diesel particulate filter regeneration inhibit switch (where applicable).

DIAGNOSTIC PANEL

A diagnostic panel shall be accessible while standing on the ground and shall be located inside the driver's side door, left of the steering column. The diagnostic panel shall allow diagnostic tools such as computers to connect to various vehicle systems for improved troubleshooting providing a lower cost of ownership. Diagnostic switches shall allow engine and ABS systems to provide blink codes should a problem exist. The diagnostic panel shall include the following:

- Engine diagnostic port
- Transmission diagnostic port
- ABS diagnostic port
- SRS diagnostic port (where applicable)
- Engine diagnostic switch (blink codes flashed on check engine telltale indicator)
- ABS diagnostic switch (blink codes flashed on ABS telltale indicator)

AIR RESTRICTION INDICATOR

A high air restriction warning indicator light (electronic) shall be provided.

- An LED temperature gauge shall be located in the cab instrument panel that measures the ambient air. The gauge shall be designed to allow readings for the exterior ambient air temperature.

"DO NOT MOVE APPARATUS" INDICATOR

A flashing red indicator light, located in the driving compartment, shall be illuminated automatically per the current NFPA requirements. The light shall be labeled "Do Not Move Apparatus If Light Is On."

The same circuit that activates the Do Not Move Apparatus indicator shall activate a steady tone alarm when the parking brake is released.

OPEN DOOR INDICATOR LIGHT

There shall be two (2) red indicator lights provided and located in clear view of the driver, warning of any open passenger or equipment compartment door(s).

- One (1) light shall indicate status of doors on the driver's side of the vehicle
- One (1) light shall indicate the status of the passenger side and rear compartment doors

CAB SWITCH PANELS

The built-in emergency light switch panel shall have a master switch plus individual switches for selective control. The switch panel shall be located in the "overhead" position above the windshield on the driver's side to allow for easy access. Switches shall be rocker type with an indicator light, of which is an integral part of the switch.

WIPER CONTROL

Wiper control shall consist of a two (2)-speed individual windshield wiper control with intermittent feature and windshield washer controls. The control shall also have a "return to park" provision, which allows the wipers to return to the stored position when the wipers are not in use.

SPARE CIRCUIT

There shall be two (2) pair of wires, including a positive and a negative, installed on the apparatus.

The above wires shall have the following features:

- The positive wire shall be connected directly to the battery switched power.
- The negative wire shall be connected to ground.
- Wires shall be protected to 10 amps at 12 volts DC.
- Power and ground shall terminate TO BE DETERMINED.
- Termination shall be with 15 amp, power point plug with rubber cover.

Wires shall be sized to 125% of the protection.

This circuit(s) may be load managed when the parking brake is set.

SPARE CIRCUIT

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The above wires shall have the following features:

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The negative wire shall be connected to ground.

Wires shall be protected to 10 amps at 12 volts DC.

Power and ground shall terminate TO BE DETERMINED.

Termination shall be with six (6) position terminal strip.

Wires shall be sized to 125% of the protection.

This circuit(s) may be load managed when the parking brake is set.

STEREO RADIO

A Jensen, heavy duty AM/FM/CD/Weatherband stereo radio, with front auxiliary input shall be installed per switch panel layout . There shall be two (2) pair of 5.25" speakers installed one (1) pair of 5.25" speakers in the cab and one (1) pair of 5.25" speakers in the crew cab (total of 4). The antenna shall be a roof-mounted rubber antenna located in an open space, on the cab roof .

The following features shall be included:

- CD Player with Electronic Skip Protection (ESP)
- Full 7-Channel NOAA Weatherband Tuner with SAME technology
- Built-in Clock
- Audio CD, CD-R, R/W, MP3 CD compatible
- Radio Broadcast Data System Text Display
- Front panel USB input
- Front and Rear Auxiliary Audio Input
- Receives audio (A2DP/AVRCP) from Bluetooth enabled device
- Supports Bluetooth HFP to receive phone calls from BT-enabled phones
- Low battery alert (<10.8Vdc)
- Heavy Duty design with Conformal Coated Circuit Boards for maximum durability under all conditions

VEHICLE DATA RECORDER

A vehicle data recorder (VDR) shall be provided. The VDR shall be capable of reading and storing vehicle information.

The information stored on the VDR can be downloaded through a USB port mounted in a convenient location determined by cab model. A CD provided with the apparatus shall include the programming to download the information from the VDR. A USB cable can be used to connect the VDR to a laptop to retrieve required information.

The vehicle data recorder shall be capable of recording the following data via hardwired and/or CAN inputs:

- Vehicle Speed - MPH
- Acceleration - MPH/sec

- Deceleration - MPH/sec
- Engine Speed - RPM
- Engine Throttle Position - % of Full Throttle
- ABS Event - On/Off
- Seat Occupied Status - Yes/No by Position (7-12 Seating Capacity)
- Seat Belt Buckled Status - Yes/No by Position (7-12 Seating Capacity)
- Master Optical Warning Device Switch - On/Off
- Time - 24 Hour Time
- Date - Year/Month/Day

RADIO ANTENNA MOUNT

There shall be three (2) standard 1.125", 18 thread antenna-mounting base(s) installed on the cab roof, aft of the lightbar, evenly spaced across the roof for high efficiency, low loss, shielded coaxial cable(s) routed to the radio mounting area. A weatherproof cap shall be installed on the mount.

Radio Mounting Location

There shall be a mounting spot for (2) DIN size radios in the dash easily reachable by the driver and passenger. They shall have a minimum clearance depth of 10" for each. The radio antenna cables should terminate in this location. Also there shall be (2) 50 amp 10 gauge red power wire hard wired to constant clean 12v power source. There shall also be (2) 5 amp 14 gauge power wires connected to the ignition power in this location. And then (2) 10 gauge black chassis ground wires at this location.

VEHICLE CAMERA SYSTEM

There shall be a color vehicle camera system provided with the following:

- One (1) camera located at the rear of the apparatus, pointing rearward, displayed automatically with the vehicle in reverse

The camera image shall be displayed on a 7.00" LCD display located mounted at pick up . The display shall include manual camera activation capability and audio from the active camera.

The following components will be included:

- One (1) MO700136DC, display
- One (1) SV-CW134639CAI, camera

- All necessary cables

ELECTRICAL POWER CONTROL SYSTEM

A compartment shall be provided in or under the cab to house the vehicle's electrical power and signal circuit protection and control components. The power and signal protection and control compartment shall contain circuit protection devices and power control devices. Power and signal protection and control components shall be protected against corrosion, excessive heat, excessive vibration, physical damage and water spray.

Serviceable components shall be readily accessible.

Circuit protection devices, which conform to SAE standard, shall be utilized to protect each circuit. All circuit protection devices shall be sized to prevent wire and component damage when subjected to extreme current overload. General protection circuit breakers shall be Type-I automatic reset (continuously resetting) and conform to SAE J553 or J258. PTO power circuits shall be protected by Type III manual reset non-cycling circuit breakers conforming to SAE J553 or J258 which remain open until manually reset. When required, automotive type fuses conforming to SAE J554, J1284, J1888 or J2077 shall be utilized to protect electronic equipment.

Power control relays and solenoids shall have a direct current (dc) rating of 125 percent of the maximum current for which the circuit is protected.

Visual status indicators shall be supplied to identify control safety interlocks and vehicle status. In addition to visual status indicators, audible alarms designed to provide early warning of problems before they become critical shall be used.

VOLTAGE MONITOR SYSTEM

A voltage monitor system shall be provided to indicate the status of each battery system connected to the vehicles electrical load. The monitor system shall provide visual and audio warning when the system voltage is above or below optimum levels.

POWER AND GROUND STUDS

There shall be two (2) studs provided in the primary power distribution center for two-way radio equipment.

The studs shall consist of the following:

12-volt 150-amp battery switched power

12-volt 75-amp direct battery power

There shall also be two (2)12-volt ground studs located in or adjacent to the power distribution center.

EMI/RFI PROTECTION

The electrical system proposed shall include means to control undesired electromagnetic and radio frequency emissions. State of the art electrical system design and components shall be used to ensure radiated and conducted EMI (electromagnetic interference) and RFI (radio frequency interference) emissions are suppressed at their source.

The apparatus proposed shall have the ability to operate in the electromagnetic environment typically found in fire ground operations. The contractor shall be able to demonstrate the EMI and RFI testing has been done on similar apparatus and certifies that the vehicle proposed meets SAE J551 requirements.

EMI/RFI susceptibility shall be controlled by applying immune circuit designs, shielding, twisted pair wiring and filtering. The electrical system shall be designed for full compatibility with low level control signals and high powered two-way radio communication systems. Harness and cable routing shall be given careful attention to minimize the potential for conducting and radiated EMI-RFI susceptibility.

ELECTRICAL

All 12-volt electrical equipment installed by the apparatus manufacturer shall conform to modern automotive practices. All wiring shall be high temperature crosslink type. Wiring shall be run, in loom or conduit, where exposed and have grommets where wire passes through sheet metal. Automatic reset circuit breakers shall be provided which conform to SAE Standards. Wiring shall be color, function and number coded. Function and number codes shall be continuously imprinted on all wiring harness conductors at 2.00" intervals. Exterior exposed wire connectors shall be positive locking, and environmentally sealed to withstand elements such as temperature extremes, moisture and automotive fluids.

Electrical wiring and equipment shall be installed utilizing the following guidelines:

1. All holes made in the roof shall be caulked with silicon, rope caulk is not acceptable. Large fender washers, liberally caulked, shall be used when fastening equipment to the underside of the cab roof.
2. Any electrical component that is installed in an exposed area shall be mounted in a manner that shall not allow moisture to accumulate in it. Exposed area shall be defined as any location outside of the cab or body.
3. Electrical components designed to be removed for maintenance shall not be fastened with nuts and bolts. Metal screws shall be used in mounting these

devices. Also a coil of wire shall be provided behind the appliance to allow them to be pulled away from mounting area for inspection and service work.

4. Corrosion preventative compound shall be applied to all terminal plugs located outside of the cab or body. All non-waterproof connections shall require this compound in the plug to prevent corrosion and for easy separation (of the plug).
5. All lights that have their sockets in a weather exposed area shall have corrosion preventative compound added to the socket terminal area.
6. All electrical terminals in exposed areas shall have silicon (1890) applied completely over the metal portion of the terminal.

All lights and reflectors, required to comply with Federal Motor Vehicle Safety Standard #108, shall be furnished. Rear identification lights shall be recessed mounted for protection. Lights and wiring mounted in the rear bulkheads shall be protected from damage by installing a false bulkhead inside the rear compartments.

An operational test shall be conducted to ensure that any equipment that is permanently attached to the electrical system is properly connected and in working order.

The results of the tests shall be recorded and provided to the purchaser at time of delivery.

BATTERY SYSTEM

Six (6) Optima, Model D31M, 12 volt 900CCA batteries shall be provided.

These batteries shall include SAE posts.

BATTERY SYSTEM

There shall be a single starting system with an ignition switch and starter button provided and located on the cab instrument panel.

MASTER BATTERY SWITCH

There shall be a master battery switch provided within the cab within easy reach of the driver to activate the battery system.

An indicator light shall be provided on the instrument panel to notify the driver of the status of the battery system.

BATTERY COMPARTMENTS

Batteries shall be stored in well-ventilated compartments that are located under the cab and bolted directly to the chassis frame. The battery compartments shall be constructed of 0.188" steel plate and be designed to accommodate a maximum of

three (3) group 31 batteries in each compartment. The battery hold-downs shall be of a non-corrosive material. All bolts and nuts shall be stainless steel.

The compartments shall include formed fit heavy duty roto-molded polyethylene battery trays with drain tubes for the batteries to sit in.

Heavy-duty battery cables shall be used to provide maximum power to the electrical system. Cables shall be color-coded.

Battery terminal connections shall be coated with anti-corrosion compound. Battery solenoid terminal connections shall be encapsulated with semi-permanent rubberized compound.

JUMPER STUDS

One (1) set of battery jumper studs with plastic color-coded covers shall be installed on the bottom of the driver's side battery box. This shall provide for easy jumper cable access.

BATTERY CHARGER

There shall be a Kussmaul Auto Charge 1200, Model 091-187-12-REMOTE-B1, battery charger provided. A bar graph display indicating the state of charge shall be provided.

The charger shall have a maximum output of 40 amps and a fully automatic regulation.

The 120-volt air compressor shall be installed to maintain the air system pressure when the vehicle is not in use.

The battery charger shall be wired to the AC shoreline inlet through an AC receptacle adjacent to this battery charger.

The battery charger shall be located in the left body compartment mounted on the front wall as high as possible.

The battery charger indicator shall be located on the driver's seat riser.

AUTO EJECT FOR SHORELINE

There shall be one (1) Kussmaul™, Model 091-55-20-120, 20 amp 120 volt AC shoreline inlet(s) provided to operate the dedicated 120 volt AC circuits on the apparatus.

The shoreline inlet(s) shall include red weatherproof flip up cover(s).

There shall be a release solenoid wired to the vehicle's starter to eject the AC connector when the engine is starting.

The shoreline(s) shall be connected to the battery charger.

There shall be a mating connector body supplied with the loose equipment.

There shall be a label installed near the inlet(s) that state the following:

- Line Voltage
- Current Ratting (amps)
- Phase
- Frequency

The shoreline receptacle shall be located on the driver side of cab, above wheel.

AUTO TRANSFER SWITCH

To protect either the generator or external power source from back feed, an automatic relay system shall be installed to switch the on line device between the generator and the external power source when it is connected for use.

The transfer switch shall power all shoreline receptacles.

ALTERNATOR

A C.E. Niehoff, model C680-1, alternator shall be provided. It shall have a rated output current of 430 amp as measured by SAE method J56. Also, it shall have a custom three (3)-set point voltage regulator, manufactured by C. E. Niehoff. The alternator shall be connected to the power and ground distribution system with heavy-duty cables sized to carry the full rated alternator output.

ELECTRONIC LOAD MANAGEMENT

There shall be a Kussmaul™, electronic load management (ELM) system provided that monitors the vehicles 12-volt electrical system, and automatically reduces the electrical load in the event of a low voltage condition and by doing so, ensures the integrity of the electrical system.

The ELM shall monitor the vehicle's voltage while at the scene (parking brake applied). It shall sequentially shut down individual electrical loads when the system voltage drops below a preset value. Five (5) separate electrical loads shall be controlled by the load manager. The ELM shall sequentially re-energize electrical loads as the system voltage recovers.

The (ELM) also includes sequencer function for the five (5) managed loads and two (2) additional.

HEADLIGHTS

There shall be four (4) rectangular halogen lights mounted in the front quad style, chrome housing on each side of the cab grille:

- The outside light on each side shall contain a halogen low and high beam module.
- The inside light on each side shall contain a halogen high beam module only.

DIRECTIONAL LIGHTS

There shall be two (2) Whelen® 600 series, LED combination directional/marker lights provided. The lights shall be located on the outside cab corners, next to the headlights.

The color of the lenses shall be the same color as the LED's.

CAB CLEARANCE/MARKER/ID LIGHTS

There shall be seven (7) amber LED lights provided to indicate the presence and overall width of the vehicle in the following locations:

- Three (3) amber LED identification lights shall be installed in the center of the cab above the windshield.
- Two (2) amber LED clearance lights shall be installed, one (1) on each outboard side of the cab above the windshield.
- Two (2) amber LED marker lights shall be installed, one (1) on each side above the cab doors.

INTERMEDIATE LIGHT

There shall be two (2) Truck-Lite®, Model 60115Y, amber LED lights furnished, one (1) each side, horizontally in the rear fender panel. The light shall double as a turn signal and marker light.

A stainless steel trim shall be included with this installation.

FRONT CAB SIDE DIRECTIONAL LIGHTS

There shall be two (2) Truck-Lite®, Model 19036Y, amber LED lights installed to the outside of the chrome wrap around bezel, one (1) on each side of the cab.

The lights shall activate as additional directional lights with the corresponding directional circuit.

REAR CLEARANCE/MARKER/ID LIGHTING

There shall be a three (3) LED light bar used as identification lights located at the rear of the apparatus per the following:

- As close as practical to the vertical centerline
- Centers spaced not less than 6.00" or more than 12.00" apart
- Red in color
- All at the same height

There shall be two (2) LED lights installed at the rear of the apparatus used as clearance lights located at the rear of the apparatus per the following:

- To indicate the overall width of the vehicle
- One (1) each side of the vertical centerline
- As near the top as practical
- Red in color
- To be visible from the rear
- All at the same height

There shall be two (2) LED lights installed on the side of the apparatus used as marker lights as close to the rear as practical per the following:

- To indicate the overall length of the vehicle
- One (1) each side of the vertical centerline
- As near the top as practical
- Red in color
- To be visible from the side
- All at the same height

There shall be two (2) red reflectors located on the rear of the truck facing to the rear. One (1) each side, as far to the outside as practical, at a minimum of 15.00", but no more than 60.00", above the ground.

There shall be two (2) red reflectors located on the side of the truck facing to the side. One (1) each side, as far to the rear as practical, at a minimum of 15.00", but no more than 60.00", above the ground.

Per FMVSS 108 and CMVSS 108 requirements.

REAR FMVSS LIGHTING

The rear stop/tail and directional LED lighting shall consist of the following:

- Two (2) Whelen®, Model M6BTT, red LED stop/tail lights
- Two (2) Whelen, Model M6T, amber LED arrow turn lights

The lights shall be provided with color lenses.

The lights shall be mounted in a polished combination housing.

There shall be two (2) Whelen Model M6BUW, LED backup lights provided in the tail light housing.

LICENSE PLATE BRACKET

There shall be one (1) license plate bracket mounted on the rear of the body.

A white LED light shall illuminate the license plate. A polished stainless steel light shield shall be provided over the light that shall direct illumination downward, preventing white light to the rear.

LIGHTING BEZEL

There shall be two (2) Whelen, Model M6FCV4P, four (4) place chromed ABS housings with Pierce logos provided for the rear M6 series stop/tail, directional, back up, scene lights or warning lights.

BACK-UP ALARM

A PRECO, Model 1040, solid-state electronic audible back-up alarm that actuates when the truck is shifted into reverse shall be provided. The device shall sound at 60 pulses per minute and automatically adjust its volume to maintain a minimum ten (10) dBA above surrounding environmental noise levels.

CAB PERIMETER SCENE LIGHTS

There shall be Truck-Lite, Model 40227C, 4.00" white incandescent lights with Model 40700, grommets provided.

The lights shall be installed under the driver, officer, and crew cab riding area exits.

These lights shall be activated automatically when the battery switch is on and the exit doors are opened or by the same means as the body perimeter scene lights.

BODY PERIMETER SCENE LIGHTS

There shall be four (4) Truck-Lite, Model 40227C, 4.00" white incandescent lights with Model 40700, grommets provided.

The lights shall be mounted in the following locations:

- One (1) light shall be provided under the driver's side pump panel running board.
- One (1) light shall be provided under the driver's side rear step area shining to the rear.
- One (1) light shall be provided under the passenger's side rear step area shining to the rear.
- One (1) light shall be provided under the passenger's side pump panel running board.

The perimeter scene lights shall be activated when the parking brake is applied.

STEP LIGHTS

Four (4) white LED step lights shall be provided. One (1) step light shall be provided on each side, on the front compartment face and two (2) step lights at the rear to illuminate the tailboard.

In order to ensure exceptional illumination, each light shall provide a minimum of 25 foot-candles (fc) covering an entire 15.00" x 15.00" square placed 10.00" below the light and a minimum of 1.5 fc covering an entire 30.00" x 30.00" square at the same 10.00" distance below the light.

These step lights shall be actuated with the pump panel light switch.

All other steps on the apparatus shall be illuminated per the current edition of NFPA 1901.

SIDE SCENE LIGHTS

There shall be two (2) Whelen®, Model M6ZC, LED scene light(s) with Model M6FC, chrome flange(s) installed on the side of the apparatus, one (1) each side high on body sides.

A control for the light(s) selected above shall be the following:

- a switch at the driver's side switch panel
- a switch at the pump operator's panel
- a switch at the rear of apparatus on the passenger's side
- no additional switch location

These lights may be load managed when the parking brake is applied.

12 VOLT LIGHTING

There shall be two (2) Whelen, Model PCP2, 12 volt LED combination spotlight and floodlight(s) installed in bail bracket(s) Whelen, Model PBA206 located One (1) each side of the upper body.

The light(s) selected above shall be controlled by the following:

a switch at the driver's side switch panel .

a switch at the pump operator's panel .

a switch at the driver's side switch panel .

no additional switch location .

The light(s) may be load managed when the parking brake is set

12 VOLT LIGHTING

There shall be two (2) Whelen® Pioneer™, Model PCP2*, 12 volt LED combination spot/flood light(s) provided on the front visor, centered over the driver and officer.

The painted parts of this light assembly to be black.

The light(s) shall be controlled by the following:

- a switch at the driver's side switch panel
- a switch at the passenger's side switch panel
- no additional switch location

These light(s) may be load managed when the parking brake is set.

DECK LIGHTS

Two (2)-6.00" Unity AG, deck lights with swivel mount shall be provided at the rear of the hose bed, one (1) each side.

Both lights shall be furnished with a 6,000 candle power halogen flood bulb.

WATER TANK

Booster tank shall have a capacity of 1000 gallons and be constructed of polypropylene plastic by United Plastic Fabricating, Incorporated.

Tank joints and seams shall be nitrogen welded inside and out.

Tank shall be baffled in accordance with NFPA Bulletin 1901 requirements.

Baffles shall have vent openings at both the top and bottom to permit movement of air and water between compartments.

Longitudinal partitions shall be constructed of .38" polypropylene plastic and shall extend from the bottom of the tank through the top cover to allow for positive welding.

Transverse partitions shall extend from 4.00" off the bottom of the tank to the underside of the top cover.

All partitions shall interlock and shall be welded to the tank bottom and sides.

Tank top shall be constructed of .50" polypropylene. It shall be recessed .38" and shall be welded to the tank sides and the longitudinal partitions.

Tank top shall be sufficiently supported to keep it rigid during fast filling conditions.

Construction shall include 2.00" polypropylene dowels spaced no more than 30.00" apart and welded to the transverse partitions. Two (2) of the dowels shall be drilled and tapped (.50" diameter, 13.00" deep) to accommodate lifting eyes.

A sump that is 8.00" long x 8.00" wide x 6.00" deep shall be provided at the bottom of the water tank.

Sump shall include a drain plug and the tank outlet.

Tank shall be installed in a fabricated cradle assembly constructed of structural steel.

Sufficient crossmembers shall be provided to properly support bottom of tank. Crossmembers shall be constructed of steel bar channel or rectangular tubing.

Tank shall "float" in cradle to avoid torsional stress caused by chassis frame flexing. Rubber cushions, .50" thick x 3.00" wide, shall be placed on all horizontal surfaces that the tank rests on.

Stops or other provision shall be provided to prevent an empty tank from bouncing excessively while moving vehicle.

Mounting system shall be approved by the tank manufacturer.

Fill tower shall be constructed of .50" polypropylene and shall be a minimum of 8.00" wide x 14.00" long.

Fill tower shall be furnished with a .25" thick polypropylene screen and a hinged cover.

An overflow pipe, constructed of 4.00" schedule 40 polypropylene, shall be installed approximately halfway down the fill tower and extend through the water tank and exit to the rear of the rear axle.

HOSE BED

The hose bed shall be fabricated of corrosion resistant, low carbon austenitic, brushed and painted 304L stainless steel. Due to superior corrosion resistance of 300 stainless grades, other grades of austenitic stainless steels, or any grade of ferritic or martensitic stainless, shall not be acceptable.

The sides shall not form any portion of the fender compartments.

Hose body width shall be minimum of 68.00" inside.

Upper and rear edges of side panels shall have a double break for rigidity, a split tube finish shall not be acceptable.

The upper inside area of the beavertails shall be covered with brushed stainless steel to prevent damage to painted surface when hose is removed.

Flooring of the hose bed shall be removable aluminum grating with the top surface corrugated to aid in hose aeration. The grating slats shall be a minimum of .50" x 4.50" with spacing between slats for hose ventilation.

Hose bed shall accommodate 400' of 3.00", 2000' of 5.00" and 400' of 3.00".

HOSE BED DIVIDER

Two (2) adjustable hosebed dividers shall be furnished for separating hose.

Each divider shall be constructed of a .125" brushed aluminum sheet fitted and fastened into a slotted, 1.50" diameter radiused extrusion along the top, bottom, and rear edge.

Divider shall be fully adjustable by sliding in tracks, located at the front and rear of the hose bed.

Divider shall be held in place by tightening bolts, at each end.

Acorn nuts shall be installed on all bolts in the hose bed which have exposed threads.

HOSE BED HOSE RESTRAINT

The hose in the hose bed shall be restrained by a black nylon Velcro® strap at the top of the hose bed. At the rear of the hose bed, 2.00" black nylon webbing with a

1.50" x 4.00" box pattern shall attach at the top rear outside corners with seat belt buckle fasteners. The webbing shall have straps connected with seat belt buckle fasteners located at the rear body sheet below the hose bed.

The rear flap of the hose bed cover shall have reflective lettering saying "Engine 6-13"

BACKBOARD STORAGE

A storage compartment for shall be located on the driver's side of the hose bed.

A nonadjustable 1/4" single sheet hose bed divider and the body side sheet shall form the sides of the compartment. The top of the compartment shall be bright aluminum treadplate. The compartment shall be full length of the hose bed.

The rearward section of the compartment shall allow for storage of a customer supplied stokes basket and two (2) backboards. The stokes basket measures 22" X 78". The stokes basket and backboard shall be stored on edge on top of the hosebed floor grating, with a partition between the stokes basket and back boards. The items shall be stored left side of the hose bed within the compartment. An aluminum treadplate door with lift and turn latch hinged along the outboard edge shall be furnished at the rear to keep the stokes basket and backboards in the stored position.

The area forward of the stokes basket shall be accessible from the top. An aluminum treadplate door with two (2) lift-and-turn latches shall be provided. The hose bed grating shall form the floor of the compartment.

RUNNING BOARDS

Running boards shall be fabricated of .125" bright aluminum treadplate.

Each running board shall be supported by a welded 2.00" square tubing and channel assembly, which shall be bolted to the pump compartment substructure.

Running boards shall be 12.75" deep and spaced .50" away from the pump panel.

A splash guard shall be provided above the running board treadplate.

TAILBOARD

The tailboard shall also be constructed of .125" bright aluminum treadplate and spaced .50" from the body, as well as supported by a structural steel assembly.

The tailboard area shall be 16.00" deep.

The exterior side shall be flanged down and in for increased rigidity of tailboard structure.

REAR WALL, SMOOTH ALUMINUM/BODY MATERIAL

The rear facing surfaces of the center rear wall shall be smooth aluminum.

The bulkheads, the surface to the rear of the side body compartments, shall be smooth and the same material as the body.

Any inboard facing surfaces below the height of the hosebed shall be aluminum diamondplate .

TOW BAR

A tow bar shall be installed under the tailboard at center of truck.

Tow bar shall be fabricated of 1.00" CRS bar rolled into a 3.00" radius.

Tow bar assembly shall be constructed of .38" structural angle. When force is applied to the bar, it shall be transmitted to the frame rail.

Tow bar assembly shall be designed and positioned to allow up to a 30-degree upward angled pull of 17,000 lb, or a 20,000 lb straight horizontal pull in line with the centerline of the vehicle.

Tow bar design shall have been fully tested and evaluated using strain gauge testing and finite element analysis techniques.

RUNNING BOARD HOSE RESTRAINT

A hinged, bright aluminum treadplate cover shall be provided over each hose tray. The cover shall have a flush lift and turn on each side. The latch shall secure the cover in the closed position and a pneumatic stay arm on each side shall hold the cover in the open position.

There shall be Two (2) hose trays located one (1) in each side running board.

HOSE TRAY

Two (2) hose trays free floating hose tray(s) to fit in the opening of the running board shall be provided one (1) in each side running board. The tray shall be flanged and drop in from the top.

Capacity of the tray shall be 25' of 5.00" hose.

Rubber matting shall be installed on the floor of the tray to provide proper ventilation.

COMPARTMENTATION

Body and compartments shall be fabricated of corrosion resistant, low carbon austenitic, brushed and painted 304L stainless steel. Due to superior corrosion resistance of 300 stainless grades, other grades of austenitic stainless steels, or any grade of ferritic or martensitic stainless, shall not be acceptable.

Side compartments shall be an integral assembly with the rear fenders.

Circular fender liners shall be provided for prevention of rust pockets and ease of maintenance.

Compartment flooring shall be of the sweep out design with the floor higher than the compartment door lip.

The compartment door opening shall be framed by flanging the edges in 1.75" and bending out again .75" to form an angle.

Drip protection shall be provided above the doors by means of bright aluminum extrusion, formed bright aluminum treadplate or polished stainless steel.

The top of the compartment shall be covered with bright aluminum treadplate rolled over the edges on the front, rear and outward side. These covers shall have the corners "TIG" welded.

Side compartment covers shall be separate from the compartment tops.

Front facing compartment walls shall be covered with bright aluminum treadplate.

All screws and bolts which protrude into a compartment shall have acorn nuts on the ends to prevent injury.

UNDERBODY SUPPORT SYSTEM

Due to the severe loading requirements of this pumper a method of body and compartment support suitable for the intended load shall be provided.

The backbone of the support system shall be the chassis frame rails which is the strongest component of the chassis and is designed for sustaining maximum loads.

The support system shall include .375" thick steel vertical angle supports bolted to the chassis frame rails with .625" diameter bolts.

Attached to the bottom of the steel vertical angles shall be horizontal angles, with gussets welded to the vertical members, which extend to the outside edge of the

body. These vertical and horizontal angles are considered extensions of the chassis frame rails and shall have the same warranty as the frame rails.

A 300 series stainless steel frame shall be mounted on the top of these supports to create a "floating substructure" which shall result in a 500 pound equipment support rating per lower compartment.

The stainless steel "floating substructure" shall be separated from the steel horizontal members with neoprene elastomer isolators. These isolators shall reduce the natural flex stress of the chassis from being transmitted to the body.

The isolators shall have a broad load range, proven viability in vehicular applications, be of a fail safe design and allow for all necessary movement in three (3) transitional and rotational modes.

The neoprene isolators shall be installed in a modified "V" three (3)-point mounting pattern to reduce the natural flex of the chassis being transmitted to the body.

A design with body compartments simply hanging on the chassis in an unsupported fashion shall not be acceptable.

AGGRESSIVE WALKING SURFACE

All exterior surfaces designated as stepping, standing, and walking areas shall comply with the required average slip resistance of the current NFPA standards.

LOUVERS

All body compartments shall have a minimum of one (1) set of louvers stamped into a wall to provide the proper airflow inside the compartment and to prevent water from dripping into the compartment. These louvers shall be formed into the metal and not added to the compartment as a separate plate.

TESTING OF BODY DESIGN

Body structural analysis shall be fully tested. Proven engineering and test techniques such as finite element analysis, model analysis, stress coating and strain gauging have been performed with special attention given to fatigue, life and structural integrity of the cab, body and substructure.

The body shall be tested while loaded to its greatest in-service weight.

The criteria used during the testing procedure shall include:

- Raising opposite corners of the vehicle tires 9.00" to simulate the twisting a truck may experience when driving over a curb.

- Making a 90 degree turn, while driving at 20 mph to simulate aggressive driving conditions.

- Driving the vehicle on at 35 mph on a "washboard" road.

- Driving the vehicle at 55 mph on a smooth road.

- Accelerating the vehicle fully, until reaching the approximate speed of 45 mph on rough pavement.

Evidence of the actual testing techniques shall be made available upon request.

COMPARTMENTATION, DRIVER'S SIDE

A vertically hinged, double door compartment in the lower area ahead of the rear wheels shall be provided. The interior dimensions of this compartment shall be 44.00" wide x 47.13" high x 25.88" deep in the lower 26.00" of the compartment and 12.00" deep in the remaining upper portion. The depth of the compartment shall be calculated with the compartment door closed. The clear door opening of this compartment shall be 39.50" wide x 42.50" high.

A positive door holder shall be furnished with this compartment.

A broom compartment with one (1) horizontally hinged, drop-down door in the area above the rear wheels shall be provided. The interior dimensions of this compartment shall be 66.50" wide x 12.38" high x 12.00" deep. The depth of the compartment shall be calculated with the compartment door closed. The clear door opening of this compartment shall be 59.50" wide x 7.75" high. The drop-down door shall be furnished with two chain-style door holders with a plastic covering around the chain. Closing of the door shall not require releasing, unlocking, or unlatching any mechanism.

A vertically hinged, double door compartment in the lower area behind the rear wheels shall be provided. The interior dimensions of this compartment shall be 47.50" wide x 47.13" high x 25.88" deep in the lower 26.00" of the compartment and 12.00" deep in the remaining upper portion. The depth of the compartment shall be calculated with the compartment door closed. The clear door opening of this compartment shall be 46.00" wide x 42.50" high.

A positive door holder shall be furnished with this compartment.

COMPARTMENTATION, PASSENGER'S SIDE

A vertically hinged, double door compartment in the lower area ahead of the rear wheels shall be provided. The interior dimensions of this compartment shall be 44.00" wide x 47.13" high x 25.88" deep in the lower 26.00" of the compartment and 12.00" deep in the remaining upper portion. The depth of the compartment shall be calculated with the compartment door closed. The clear door opening of this compartment shall be 39.50" wide x 42.50" high.

A positive door holder shall be furnished with this compartment.

A broom compartment with one (1) horizontally hinged, drop-down door in the area above the rear wheels shall be provided. The interior dimensions of this compartment shall be 66.50" wide x 12.38" high x 12.00" deep. The depth of the compartment shall be calculated with the compartment door closed. The clear door opening of this compartment shall be 59.50" wide x 7.75" high. The drop-down door shall be furnished with two chain-style door holders with a plastic covering around the chain. Closing of the door shall not require releasing, unlocking, or unlatching any mechanism.

A vertically hinged, double door compartment in the lower area behind the rear wheels shall be provided. The interior dimensions of this compartment shall be 47.50" wide x 47.13" high x 25.88" deep in the lower 26.00" of the compartment and 12.00" deep in the remaining upper portion. The depth of the compartment shall be calculated with the compartment door closed. The clear door opening of this compartment shall be 46.00" wide x 42.50" high.

A positive door holder shall be furnished with this compartment.

DOORS, SIDE COMPARTMENT

All hinged compartment doors shall be lap style with double panel construction and shall be a minimum of 1.50" thick. To provide additional door strength a "C" section reinforcement shall be installed between the outer and interior panels.

Doors shall be provided with a closed cell rubber gasket around the surface that laps onto the body. A second heavy-duty automotive rubber molding with a hollow core shall be installed on the door framing that seals onto the interior panel, to ensure a weather resisting compartment.

All compartment doors shall have polished stainless steel continuous hinge with a pin diameter of .25" that is bolted or screwed on with stainless steel fasteners. (Hinges which are welded on shall not be acceptable.)

All door locking mechanisms shall be fully enclosed within the door panels to prevent fouling of the lock in the event equipment inside shifts into the lock area.

Doors shall be latched with recessed, polished stainless steel "D" ring handles and FMVSS approved door locking mechanisms.

To prevent corrosion caused by dissimilar metals, compartment door handles shall not be attached to outer door panel with screws. A rubber gasket shall be provided between the "D" ring handle and the door.

COMPARTMENTATION, REAR

A vertically hinged, double door compartment above the rear tailboard shall be provided. Interior dimensions of this compartment shall be 40.00" wide x 54.13" high x 25.88" deep. Depth of the compartment shall be calculated with the compartment door closed.

For a chassis with a rear mounted fuel tank, a louvered removable access panel shall be furnished on the back wall of the compartment.

Rear compartment shall be open into the rear side compartments.

Clear door opening of this compartment shall be 34.50" wide x 49.50" high.

Each of the vertically hinged compartment doors shall be provided with a positive door holder.

DOORS, REAR COMPARTMENT

All hinged compartment doors shall be lap style with double panel construction and shall be a minimum of 1.50" thick. To provide additional door strength, a "C" section reinforcement shall be installed between the outer and interior panels.

Doors shall be provided with a closed cell rubber gasket around the surface that laps onto the body. A second heavy-duty automotive rubber molding with a hollow core shall be installed on the door framing that seals onto the interior panel, to ensure a weather resisting compartment.

All compartment doors shall have polished stainless steel continuous hinge with a pin diameter of .25", that is bolted or screwed on with stainless steel fasteners. (Hinges which are welded on shall not be acceptable.) A strip of dielectric isolation tape shall be provided between the hinge and door jamb.

All door lock mechanisms shall be fully enclosed within the door panels to prevent fouling of the lock in the event equipment inside shifts into the lock area.

Doors shall be latched with recessed, polished stainless steel "D" ring handles and Eberhard 106 locks.

To prevent corrosion caused by dissimilar metals, compartment door handles shall not be attached to outer door panel with screws. A rubber gasket shall be provided between the "D" ring handle and the door.

COMPARTMENT LIGHTING

There shall be 6.00" diameter Truck-Lite, Model 79384, light(s) provided in each enclosed compartment. Each light shall have a number 1076 one (1) filament, two wire bulb.

Opening the compartment door shall automatically turn compartment lighting on.

MOUNTING TRACKS

There shall be six (6) sets of tracks for mounting shelf(s) in all body compartments. These tracks shall be installed vertically to support the adjustable shelf(s), and shall be full height of the compartment. The tracks shall be painted to match the compartment interior.

ADJUSTABLE SHELVES

There shall be seven (7) shelves with a capacity of 500 lb provided. The shelf construction shall consist of .188" aluminum with 2.00" sides. Each shelf shall be painted to match the compartment interior. Each shelf shall be infinitely adjustable by means of a threaded fastener, which slides in a track.

The shelves shall be held in place by .12" thick stamped plated brackets and bolts.

The location shall be D3 Upper, D1 Upper, D1 Lower, P3 Upper, P3 Lower, P1 Upper, P1 Lower.

SLIDE-OUT ADJUSTABLE HEIGHT TRAY

There shall be five (5) slide-out trays provided.

Each tray shall have 2.00" high sides and a capacity rating of up to 500 lb in the extended position.

Each tray shall be mounted on a pair of side mounted slides. The slide mechanisms shall have ball bearings for ease of operation and years of dependable service. The slides shall be mounted to shelf tracks to allow the tray to be adjustable up and down within the designated mounting location.

An automatic lock shall be provided for both the in and out tray positions. The lock trip mechanism shall be located at the front of the tray and shall be easily operated with a gloved hand.

The tray(s) shall be located Two (2) in Driver side front, One (1) in the Drivers side rear, One (1) in the Passenger side front, One (1) in Passenger side rear..

COMPARTMENT GRATING

Vinyl grating shall be provided in six (6) compartments. The locations are, on all compartment floors.

The vinyl grating shall be .50" thick and be cross bonded by .25" diameter ribbed sections spaced for aeration.

COMPARTMENT GRATING

Vinyl grating shall be provided in 12 trays or shelves. The locations are, in all trays/shelves.

The vinyl grating shall be .50" thick and be cross bonded by .25" diameter ribbed sections spaced for aeration.

HOSE STORAGE RACK

A rack for storage of hose rolled shall be provided in compartment Driver side front pull out . The rack shall be sized to hold TO BE DETERMINED rolls of hose, in individual slots, stored vertically between adjustable partitions.

The rack shall be constructed with 3/16" smooth adjustable dividers, and shall include knockouts in the end of the rack away from the compartment wall to allow for hose drying. There shall be two shelf tracks on the floor of the compartment, and one track on the rear wall. The tracks shall allow the dividers to be adjustable.

HYDRAULIC HOSE REEL (In rear compartment)

Two (2) Hannay Model EF2220-17-18 electric rewind reel shall be provided. The hose reel shall be designed to allow operation of a hydraulic tool away from the power unit and rescue vehicle. The reel shall have an oven-cured enamel finish, graphite shade silver in color. The reel drum and frame shall be constructed of heavy gauge steel. Bearings shall be self-aligning. The hose reel shall be powered by a 12 volt DC electric motor with a chain and sprocket drive for efficient deployment. The reel shall be equipped with push-button control #90030 in a position where the operator can safely observe the rewinding operation.

The reel shall be equipped with 4-way "C" Rollers, and a HS-35 hose

stop.

HYDRAULIC RESCUE HOSE (In rear compartment)

The reel(s) shall be equipped with (100) feet of Hurst hydraulic hose to supply pressurized fluid to a tool and return fluid back to the power unit reservoir. The lines shall be constructed of thermoplastic with a Kevlar reinforcement and have a maximum working pressure of 10,500 psi. Both inner and outer lines shall have a 4:1 safety factor.

The hose shall include Hurst couplings on one (1) end to attach to the hydraulic tool and the other end shall connect directly to the hose reel.

Connection to reels and testing on fire department power unit shall be completed by fire department.

The hydraulic hose reel shall be located at pre construction meeting.

HURST TOOL PUMP MOUNTING

The Fire Department Supplies Hurst Duo Hydraulic pump will need to be mounted, connected to power, and connected to the hydraulic reels in the read body compartment. Exact location and logistics of getting pump to the manufacture shall be worked out at the pre-construction conference. Mounting provision must be made by the manufacture but actual mounting can be made at the local dealer.

RUB RAIL

Bottom edge of the side and rear of the body compartments shall be trimmed with a bright aluminum extruded rub rail.

Trim shall be 2.12" high with 1.38" flanges turned outward for rigidity.

The rub rails shall not be an integral part of the body construction, which allows replacement in the event of damage.

BODY FENDER CROWNS

Stainless steel fender crowns shall be provided around the rear wheel openings.

A rubber welting shall be provided between the body and the crown to seal the seam and restrict moisture from entering.

A dielectric barrier shall be provided between the fender crown fasteners (screws) and the fender sheet metal to prevent corrosion.

HOSE TROUGH

One (1) trough for hard suction hose shall be installed on the top of the Zico Quic-Lift electric lowering system. Velcro straps shall be provided to secure the hose to the trough.

HARD SUCTION RACK

The hard suction hose shall be mounted above on the driver side body compartments in a Zico Quic-Lift electric hard sleeve lowering system. The rack shall be designed to carry three (3) hard suction hose.

The rack mounts shall be powered by two (2), 12-volt electric actuators.

The electric controls shall be located in such a manner to allow the operator full view of the area in which the sleeves shall be lowered. A stainless steel door shall be provided over the control panel to provide a neat, trim appearance and protect the controls.

The electric actuator control shall have a master switch and be interlocked to prevent operation should a compartment door, in the travel area of the trough, be in the open position.

HARD SLEEVE RACK INTERLOCK AND NOT STOWED INDICATOR LIGHT

An interlock shall be provided to prevent operation of the hard suction hose rack unless the apparatus parking brake has been activated.

A steady red indicator light shall be located on the cab instrument panel and illuminated when the rack is not in the stowed position.

LIGHTS, FLASHING

Flashing amber lights facing the front and rear shall be provided on the hard suction rack and activated whenever the rack is in the down position.

HARD SUCTION HOSE TROUGHS, ADDITIONAL

A third hose trough shall be provided and installed on the passenger side above the ladders.

HANDRAILS

One (1) vertical handrail, not less than 29.00" long, shall be located on each rear beavertail.

- One (1) full width horizontal handrail shall be provided below the hose bed at the rear of the apparatus.

AIR BOTTLE STORAGE (TRIPLE)

A quantity of three (3) air bottle compartments designed to hold (3) air bottles up to 7.25" in diameter x 26.00" deep shall be provided on the driver side forward of the rear wheels, on the passenger side forward of the rear wheels and on the passenger side rearward of the rear wheels. A polished stainless steel door with a chrome plated flush lift & turn latch shall be provided to contain the air bottle. A dielectric barrier shall be provided between the door hinge, hinge fasteners and the body sheet metal.

Inside the compartment, black rubber matting shall be provided.

AIR BOTTLE COMPARTMENT STRAP

A strap shall be provided in the air bottle compartment(s) to help contain the air bottles when the vehicle is parked on an incline. The strap shall wrap around the neck and attach to the wall of the compartment.

LADDER RACK

Ground ladders shall be mounted above right side of body compartments in a Zico Quic-Lift electric ladder lowering system. The ladder rack mounts shall be powered by two (2), 12-volt electric actuators.

The electric controls shall be located in such a manner to allow the operator full view of the area in which the ladders shall be lowered.

The electric actuator control shall have a master switch and be interlocked to prevent operation should a compartment door, in the travel area of the ladder bracket, be in the open position.

LADDER RACK INTERLOCK AND NOT STOWED INDICATOR LIGHT

An interlock shall be provided to prevent operation of the ladder rack unless the apparatus parking brake has been activated.

A steady red indicator light shall be located on the cab instrument panel and illuminated when the ladder rack is not in the stowed position. The light shall be labeled "Ladder Rack". In addition, the "Do Not Move Apparatus" light located in the cab shall be activated when the ladder rack is not in the stowed position.

LIGHTS, FLASHING, LADDER RACK

Flashing amber lights facing the front and rear shall be provided on the ladder rack and activated whenever the rack is in the down position.

PIKE POLE PROVIDED BY FIRE DEPARTMENT

NFPA 1901, 2009 edition, Section 5.8.3 requires one (1) 8 ft or longer pike pole mounted in a bracket fastened to the apparatus.

The pike pole is not on the apparatus as manufactured. The fire department shall provide and mount the pike pole.

The pike pole(s) shall be a Akron 10' pike pole.

6 FT PIKE POLE PROVIDED BY FIRE DEPARTMENT

NFPA 1901, 2009 edition, Section 5.8.3 requires one (1) 6 ft pike pole or plaster hook mounted in a bracket fastened to the apparatus.

The pike pole is not on the apparatus as manufactured. The fire department shall provide and mount the pike pole.

The pike pole(s) shall be a Akron 6' pike pole.

PIKE POLES/FOLDING LADDER COMPARTMENT

A compartment shall be provided, recessed below the water tank tee at the rear of body, on the driver's side.

The compartment shall be equipped with two (2) pvc tubes for storage of two (2) straight handled pike poles and (1) stainless steel trough for storage of (1) folding ladder.

A stainless steel door shall be provided at the rear with a lift and turn latch.

REAR FOLDING STEPS

Bright finished, non-skid folding steps with a black coating shall be provided at the rear. Each step shall incorporate an LED light to illuminate the stepping surface. The steps can be used as a hand hold with two openings wide enough for a gloved hand.

PUMP

Pump shall be a Waterous CSU, 2000 gpm single (1) stage midship mounted centrifugal type.

Pump shall be the class "A" type.

Pump shall deliver the percentage of rated discharge at pressures indicated below:

- 100% of rated capacity at 150 psi net pump pressure.

-70% of rated capacity at 200 psi net pump pressure.

-50% of rated capacity at 250 psi net pump pressure.

Pump body shall be close-grained gray iron, bronze fitted, and horizontally split in two (2) sections for easy removal of the entire impeller shaft assembly (including wear rings).

Pump shall be designed for complete servicing from the bottom of the truck, without disturbing the pump setting or apparatus piping.

Pump case halves shall be bolted together on a single horizontal face to minimize a chance of leakage and facilitate ease of reassembly. No end flanges shall be used.

Discharge manifold of the pump shall be cast as an integral part of the pump body assembly and shall provide a minimum of three (3) 3.50" openings for flexibility in providing various discharge outlets for maximum efficiency.

The three (3) 3.50" openings shall be located as follows: one (1) outlet to the right of the pump, one (1) outlet to the left of the pump, and one (1) outlet directly on top of the discharge manifold.

Impeller shaft shall be stainless steel, accurately ground to size. It shall be supported at each end by sealed, anti-friction ball bearings for rigid precise support. Impeller shall have flame plated hubs assuring maximum pump life and efficiency despite any presence of abrasive matter in the water supply.

Bearings shall be protected from water and sediment by suitable stuffing boxes, flinger rings, and oil seals. No special or sleeve type bearings shall be used.

Stuffing boxes shall be of the conventional two (2) piece, split-gland type, to permit adjustment or replacement of Grafoil packing without disturbing the pump. Water shall be fed into stuffing box lantern rings for proper lubrication and cooling when the pump is operating.

Lantern rings shall be located at the inner ends of the stuffing boxes, to avoid having to remove them when replacing pump packing.

Wear rings shall be bronze and easily replaceable to restore original pump efficiency and eliminate the need to replace the entire pump casing due to wear.

PUMP TRANSMISSION

Pump transmission shall be made of a three (3) piece, aluminum, horizontally split casing. Power transfer to pump shall be through a high strength Morse HY-VO silent drive chain.

Drive shafts shall be a minimum of 2.35" diameter hardened and ground alloy steel. All shafts shall be ball bearing supported. The case shall be designed as to eliminate the need for water cooling.

AIR PUMP SHIFT

Pump shift engagement shall be made by a two (2) position sliding collar, actuated pneumatically (by air pressure), with a three (3) position air control switch located in the cab. A manual back-up shift control shall also be located on the pump operator's pump panel.

Two (2) indicator lights shall be provided adjacent to the pump shift inside the cab. One (1) green light shall indicate the pump shift has been completed and be labeled "pump engaged". The second green light shall indicate when the pump has been engaged, and that the chassis transmission is in pump gear. This indicator light shall be labeled "OK to pump".

Another green indicator light shall be installed adjacent to the hand throttle on the pump panel and indicate either the pump is engaged and the road transmission is in pump gear, or the road transmission is in neutral and the pump is not engaged. This indicator light shall be labeled "Warning: Do not open throttle unless light is on".

The pump shift control in the cab shall be illuminated to meet NFPA requirements.

TRANSMISSION LOCK-UP

The direct gear transmission lock-up for the fire pump operation shall engage automatically when the pump shift control in the cab is activated.

AUXILIARY COOLING SYSTEM

A supplementary heat exchange cooling system shall be provided to allow the use of water from the discharge side of the pump for cooling the engine water. Heat exchanger shall be cylindrical type and shall be a separate unit. It shall be installed in the pump or engine compartment with the control located on the pump operator's control panel. Exchanger shall be plumbed to the master drain valve.

INTAKE RELIEF VALVE

An Elkhart relief valve shall be installed on the suction side of the pump preset at 125 psig.

Relief valve shall have a working range of 75 psig to 250 psig.

Outlet shall terminate below the frame rails with a 2.50" National Standard hose thread adapter and shall have a "do not cap" warning tag.

Control shall be located behind an access door at a side pump panel.

PRESSURE GOVERNOR

This apparatus shall be equipped with a Class1 "Sentry" engine/pump governor/throttle system that is connected directly to the Electronic Control Module (ECM) mounted on the engine. The "Sentry" is to operate as a pressure sensor (regulating) governor (PSG).

A special preset feature shall permit a predetermined pressure of RPM to be set. The preset pressure or RPM will be displayed on the message display of the "Sentry" . The preset shall be easily adjustable by the operator.

The pressure sensor governor system shall be operable only after the vehicle parking brake has been set, the transmission is the pumping mode, and the fire pump has been engaged.

The pressure sensor governor system shall have two (2) modes of operation: pressure mode or rpm mode.

When in the pressure mode, the PSG system shall automatically maintain the discharge pressure set by the operator regardless of flow (within engine/pump operating capabilities).

In the rpm mode, the PSG system shall automatically maintain a set engine speed, regardless of engine load (within engine operation capabilities).

A pump cavitation protection feature shall be provided which shall return the engine to idle should the pump cavitate.

The digital display shall include:

- Pump intake

- Pump discharge pressure

- Engine RPM

- Battery voltage

- Oil pressure and temperature

- Coolant temperature

- Transmission Temperature

- Total engine hours

- Total pump hours

- Fuel rate

- Target pressure display

The engine throttle shall be a separate Twister rotary knob that can be operated in clockwise or counter clockwise operation.

HALE ESP DUAL PRIMING PUMP

The two (2) priming pumps shall be positive displacement vane type, electrically driven, and conforming to standards outlined in NFPA pamphlet #1901.

One (1) Hale SPV electrically actuated priming valve control shall be used to control both of the priming pumps.

Primer shall be environmentally safe, self lubricating style. This primer shall not require an oil tank to prevent oil from being expelled onto the ground.

PUMP MANUALS

There shall be a total of two (2) pump manuals provided by the pump manufacturer and furnished with the apparatus. The manuals shall be provided by the pump manufacturer in the form of two (2) CDs. Each manual shall cover pump operation, maintenance, and parts.

PLUMBING, STAINLESS STEEL AND HOSE

All inlet and outlet lines shall be plumbed with either stainless steel pipe or hydraulic type hose. All hose shall be equipped with high pressure brass or stainless steel couplings. All hose and fittings shall have a minimum of 500 PSI working pressure. Stainless steel hard plumbing shall be a minimum of Schedule 10.

Where vibration or chassis flexing may damage or loosen piping or where a coupling is required for servicing, the piping shall be equipped with victaulic or rubber couplings.

All lines to drain through either a master drain valve or shall be equipped with individual drain valves. Discharge drains shall be extended to drain below the chassis frame with 3/4" rubber hose.

All individual pump primer lines shall be hydraulic type hose.

All water carrying gauge lines shall be hydraulic type hose.

MAIN PUMP INLETS

A 6.00" pump manifold inlet shall be provided on each side of the vehicle. The suction inlets shall include removable die cast zinc screens that are designed to provide cathodic protection for the pump, thus reducing corrosion in the pump.

MAIN PUMP INLET CAP

The main pump inlets shall have National Standard Threads with a long handle chrome cap.

The cap shall incorporate a thread design to automatically relieve stored pressure in the line when disconnected (no exception).

INLET BUTTERFLY VALVE

One (1) butterfly valve shall be provided on the passenger's side main pump inlet.

The 6.00" inlet valve shall be provided with a built-in, adjustable pressure relief valve and a 3/4" bleeder valve shall be provided on the inlet side of the valve.

The valve shall be electrically operated with an Elkhart U2F electric valve actuator. An Elkhart UBEC1 valve controller with LED indicator lights shall be provided at the pump operator's panel.

The electric actuator shall be furnished with a manual over ride, accessible from the pump panel. A wrench shall be provide to manually open or close the valve.

INLET BUTTERFLY VALVE

One (1) butterfly valve shall be provided on the driver's side main pump inlet.

The 6.00" inlet valve shall be provided with a built-in, adjustable pressure relief valve and a 3/4" bleeder valve shall be provided on the inlet side of the valve.

The valve shall be electrically operated with an Elkhart U2F electric valve actuator. An Elkhart UBEC1 valve controller with LED indicator lights shall be provided at the pump operator's panel.

The electric actuator shall be furnished with a manual over ride, accessible from the pump panel. A wrench shall be provide to manually open or close the valve.

VALVES

All valves, 3.00" and smaller, shall be Hale Torrent SVS series stainless steel.

The valves shall be a swing out design for ease of service. The valves shall have a stainless steel ball for long life and reduced service.

LEFT SIDE INLET
On the left side pump panel, shall be one (1) - 3.00" auxiliary inlet terminating in 3.00" National Standard Hose Thread. The auxiliary inlet shall be provided with a strainer, chrome swivel and plug.

RIGHT SIDE INLET
On the right side pump panel, shall be one (1) - 3.00" auxiliary inlet terminating in 3.00" National Standard Hose Thread. The auxiliary inlet shall be provided with strainer, chrome swivel and plug.

Inlet valve location shall be behind the pump panel.

ANODE, INLET
A pair of sacrificial zinc anodes shall be provided in the water pump inlets to protect the pump from corrosion.

INLET CONTROL
There shall be three (3) inlets. Gating shall be accomplished at the top-mount control panel by means of a control lever, similar to that used for the discharges.

FRONT INLET
A 6.00" inlet front inlet with die cast zinc screens shall be provided using 5.00" stainless steel pipe and a 5.00" butterfly valve. Only radiused elbows shall be used in the piping, no mitered joints.

Drains are furnished in all the low points of piping and have .75" valves with swing handle.

A bleeder valve shall be located at the threaded connection.

The front suction shall be located on the passenger side of the bumper extension.

FRONT INLET CONTROL
The front inlet shall be gated with the control located at the pump operator's panel. The valve operating mechanism shall indicate the position of the valve or an indicator shall be provided to show when the valve is closed.

There shall be an Elkhart model UBEC1 electric valve controller provided. The controller unit shall provide position feedback with a 10 LED display that indicates closed to fully open status. The controller shall be completely sealed with two (2) button open and close valve position.

A manual override shall be provided on the valve. A stainless steel door located on the passenger side pump panel shall be provided for access to the manual override.

A momentary toggle switch shall be provided behind the stainless steel access door near the manual override. The switch shall cut off power to the valve to allow for manual valve actuation.

INTAKE RELIEF VALVE

An intake relief valve, preset at 125 psig, shall be installed on the inlet side of the valve.

Relief valve shall have a working range of 75 psig to 250 psig.

Outlet shall terminate below the frame rails.

FRONT INLET CAP

The front inlet shall have National Standard hose threads with a long handle chrome plated cap.

The cap shall incorporate a thread design to automatically relieve stored pressure in the line when disconnected (no exception).

The front suction shall have a chromed 6.00" swivel with National Standard hose threads and a long handle chromed plated cap.

The swivel shall have a smooth surface chrome finish.

INLET BLEEDER VALVE

A 0.75" bleeder valve shall be provided for each side gated inlet. The valves shall be located behind the panel with a swing style handle control extended to the outside of the panel. The handles shall be chrome plated and provide a visual indication of valve position. The swing handle shall provide an ergonomic position for operating the valve without twisting the wrist and provides excellent leverage. The water discharged by the bleeders shall be routed below the chassis frame rails.

TANK TO PUMP

The booster tank shall be connected to the intake side of the pump with heavy duty piping and a quarter turn Hale Torrent SVS series stainless steel 3.00" full flow line valve with the control remotely located at the operator's panel. Tank to pump line to run straight (no elbows) from the pump into the front face of the water tank and angle down into the tank sump. A rubber coupling shall be included in this line to prevent damage from vibration or chassis flexing.

A check valve shall be provided in the tank to pump supply line to prevent the possibility of "back filling" the water tank.

TANK REFILL

A 3.00" combination tank refill and pump recirculation line shall be provided, using a quarter-turn full flow Hale stainless steel ball valve controlled from the pump operator's panel.

LEFT SIDE DISCHARGE OUTLETS

There shall be one (1) discharge outlet with a 3.00" valve on the left side of the apparatus, terminating with a 2.50" (M) National Standard hose thread adapter.

RIGHT SIDE DISCHARGE OUTLETS

There shall be one (1) discharge outlet with a 3.00" valve on the right side of the apparatus, terminating with male 2.50" National Standard hose thread adapter.

LARGE DIAMETER DISCHARGE OUTLET

There shall be a 4.00" discharge outlet with a 4.00" Hale stainless steel valve installed on each side of the apparatus, terminating with a 5.00" Stortz.

These discharge outlets shall be actuated with an Akron Navigator Pro electric actuator and model 9323 control head at the pump operator's control panel.

FRONT DISCHARGE OUTLET

There shall be one (1) 2.50" discharge outlet piped to the front of the apparatus and located on the top of the left side of the front bumper.

Plumbing shall consist of 2.50" piping and flexible hose with a 2.50" full flow valve with control at the pump operator's panel. A fabricated weldment made of stainless steel pipe shall be used in the plumbing where appropriate. The piping shall terminate with a 2.50" NST with 90 degree stainless steel swivel.

There shall be Class 1 automatic drains provided at all low points of the piping.

REAR DISCHARGE OUTLET

There shall be one (1) discharge outlet piped to the rear of the hose bed, on passenger's side, installed so proper clearance is provided for spanner wrenches or adapters. Plumbing shall consist of 3.00" piping along with a 3.00" full flow ball valve with the control from the pump operator's panel. The one (1) discharge outlet shall terminate with a 2.50" male National Standard hose thread adapter.

DISCHARGE CAPS

Chrome plated, rocker lug, caps with chains shall be furnished for all side discharge outlets.

The caps shall incorporate a thread design to automatically relieve stored pressure in the line when disconnected (no exception).

OUTLET BLEEDER VALVE

A 0.75" bleeder valve shall be provided for each outlet 1.50" or larger. Automatic drain valves are acceptable with some outlets if deemed appropriate with the application.

The valves shall be located behind the panel with a swing style handle control extended to the outside of the side pump panel. The handles shall be chrome plated and provide a visual indication of valve position. The swing handle shall provide an ergonomic position for operating the valve without twisting the wrist and provides excellent leverage. Bleeders shall be located at the bottom of the pump panel. They shall be properly labeled identifying the discharge they are plumbed in to. The water discharged by the bleeders shall be routed below the chassis frame rails.

LEFT SIDE OUTLET ELBOWS

The 2.50" discharge outlets located on the left side pump panel shall be furnished with a 2.50" (F) National Standard hose thread x 2.50" (M) National Standard hose thread, chrome plated, 45 degree elbow.

The elbow shall incorporate a thread design to automatically relieve stored pressure in the line when disconnected (no exception).

RIGHT SIDE OUTLET ELBOWS

The 2.50" discharge outlets located on the right side pump panel shall be furnished with a 2.50" (F) National Standard hose thread x 2.50" (M) National Standard hose thread, chrome plated, 45 degree elbow.

The elbow shall incorporate a thread design to automatically relieve stored pressure in the line when disconnected (no exception).

REAR OUTLET ELBOWS

The 2.50" discharge outlets located at the rear of the apparatus shall be furnished with a 2.50" (F) National Standard hose thread x 2.50" (M) National Standard hose thread, chrome plated, 45 degree elbow.

The elbow shall incorporate a thread design to automatically relieve stored pressure in the line when disconnected (no exception).

LARGE DIAMETER OUTLET ELBOWS

The 4.00" outlet(s) shall be furnished with two (2) 4.00" (F) National Standard hose thread x 5.00" Storz elbow adapter with Storz cap.

REDUCER

There shall be three (3) adapters with 2.50" FNST x 1.50" MNST threads and a 1.50" chrome plated cap installed on Front Trashline, DS & PS 2.50" outlets.

DISCHARGE OUTLET CONTROLS

The discharge outlets shall incorporate a quarter-turn ball valve with the control located at the pump operator's panel. The valve operating mechanism shall indicate the position of the valve.

If a handwheel control valve is used, the control shall be a minimum of a 3.9" diameter stainless steel handwheel with a dial position indicator built in to the center of the handwheel.

DELUGE RISER

A 4.00" deluge riser shall be installed above the pump in such a manner that a monitor can be mounted and used effectively.

Piping shall be installed securely so no movement develops when the line is charged.

The riser plumbing shall include a 4.00" full flow valve and 4.00" i.d. plumbing.

Valve shall be electrically operated. An electric actuator, with three (3) valve position indicator lights shall be provided at the pump operator's panel.

MONITOR

An Akron Model #3581 "Stream Master" monitor shall be properly installed on the deluge riser.

The monitor shall have a dual handwheel controlled single waterway for flows up to 2000 GPM (7600 LPM). It shall have a full 360 horizontal travel and 135 degree vertical travel, both with adjustable stops.

The monitor shall be painted to match the body.

NOZZLE, DELUGE

An Akron Akromatic 2000gpm Master Stream Nozzle with 3.50" swivel shall be provided. The nozzle shall have a range of 500 to 2000 GPM.

The nozzle shall have a manual pattern control.

The deluge riser shall have ASA 150 lb 4.00" mounting flange for mounting the monitor.

SPEEDLAYS

Ahead of the pump enclosure shall be two (2)-1.75" speedlay hose beds. Each bed shall have a 2.00" preconnect line with a 2.00" quarter-turn ball valve and terminate with an 1.50" National Standard hose thread 90 degree swivel.

Individual controls for the speedlays shall be at the pump operator's panel.

Each compartment shall be capable of carrying 300' of 1.75" double jacketed hose with the one (1) compartment located above the other.

Scuffplates shall be provided at the sides and bottom of each opening on both sides.

Speedlay flooring shall consist of removable perforated brushed aluminum.

CROSSLAY/DEADLAY HOSE RESTRAINT

Elastic netting shall be provided across the top and ends of two (2) crosslay/deadlay opening(s) to secure the hose during travel. The netting shall be permanently attached at the top center of the crosslay/deadlay bed and removable on each end.

FOAM CONCENTRATE PROPORTIONING SYSTEM

A Waterous Advantus 3E single agent foam proportioner capable of proportioner 3.0 gpm of class "A" foam concentrate shall be supplied.

The foam system shall be plumbed to three (3) discharges. The discharges capable of dispensing foam shall be left side of front bumper, front crosslay and rear crosslay.

FOAM SYSTEM, CAFS

A Waterous One Step compressed air foam system with a digital touch screen for compressed air foam shall be provided.

The three (3) discharges that shall be plumbed with CAFS are Front Trashline and both crosslays.

FOAM TANK REFILL SYSTEM

A Waterous FoamFill foam tank refill system shall be provided for Class A foam. A 12 or 24 volt pump shall be permanently mounted in the pump compartment. The pump shall deliver a minimum flow of 10 gpm. A female quick disconnect fitting shall be provided on the pump panel and a pick-up wand with a 6', .75" ID reinforced hose and mating male fitting shall be provided loose. A three-way fill/flush valve shall be provided on the pump panel to allow the operator to easily flush the system after each use.

The control panel for the pump shall be located on the pump panel adjacent to the quick disconnect fitting. The pump shall be plumbed to the foam tank allowing the user to refill the foam tank from the ground.

FOAM SYSTEM AND CAFS TRAINING

The fire department shall order one (1) vehicle with this foam system and CAFS. A demonstration of these systems shall be provided at the apparatus manufacturers facility.

This demonstration shall include:

- A review of the foam system and CAFS manuals, emphasizing key areas

- A walk around review of the system components on the finished truck

- A hands-on start-up and foam and CAFS discharge session

- Instructions on the use of the manual overrides

- The proper way to shut down and flush the system.

FOAM TANK

The foam tank shall be an integral portion of the polypropylene water tank. The cell shall have a capacity of 30 gallons of foam with the intended use of Class A foam. The foam cell shall not reduce the capacity of the water tank. The foam cell shall have a screen in the fill dome and a breather in the lid.

FOAM TANK DRAIN

The foam tank drain shall be a 1.00" drain valve located inside the pump compartment accessible through a door on the passenger's side pump panel.

PUMP COMPARTMENT

The pump compartment shall be separate from the hose body and compartments so that each may flex independently of the other. It shall be a fabricated assembly of steel tubing, angles and channels which support both the fire pump and the side running boards.

Compartment shall be mounted on chassis frame rails with rubber biscuits in a four (4) point pattern to allow for chassis frame twist.

Pump compartment, pump, plumbing and gauge panels shall be removable from the chassis as a single assembly.

PUMP MOUNTING

Pump shall be mounted to a substructure which shall be mounted to the chassis frame rail using rubber isolators. The mounting shall allow chassis frame rails to flex independently without damage to the fire pump.

PUMP CONTROL PANELS (TOP MOUNT)

All pump controls and gauges to be properly marked and located above the pump to the rear of the walkway. Operator to face the rear of the truck when viewing the control panel from the operating position.

The control panel shall be in two planes.

The upper plane shall be hinged at the bottom with a full length stainless steel hinge.

Both planes to be full width of the pump house structure.

The side pump panels shall be 52.00" wide.

The side pump panels shall be removable for ease of maintenance.

Polished stainless steel trim collars to be installed around all inlets and outlets.

Controls shall have chrome plated bezels encircling the opening securely mounted to the pump panel. Identification tags for the discharge controls shall be recessed within the same bezel. The discharge identification tags shall be color coded, with each discharge having its own unique color.

All remaining identification tags shall be mounted on the pump panel in chrome plated bezels.

WALKWAY

A 19.00" wide walkway shall be provided for access to the top control panel. The walkway shall be constructed of bright aluminum treadplate and properly reinforced.

There shall be six (6) six (6) white LED lights provided to illuminate the walkway. The lights shall come on with the body perimeter lights.

WALKWAY TOOL COMPARTMENT

A tool compartment shall be provided on each side of the walkway. Each compartment shall have an aluminum treadplate door and shall be equipped with two (2) white LED lights with chrome bezels, one (1) in each compartment .

PUMP PANEL CONFIGURATION

The pump panel configuration shall be neat and orderly.

PUMP AND GAUGE PANEL

The side control panels shall be constructed of aluminum with a painted FormCoat black finish. A polished aluminum trim molding shall be provided around each panel.

The gauge and top mount control panels shall be constructed of aluminum with a painted FormCoat black finish. A polished aluminum trim molding shall be provided around each panel.

The gauge panel shall be hinged at the bottom with a full length stainless steel hinge. The fasteners that hold the panel in the up right position shall be quarter-turn style. Vinyl covered chains shall be used to hold the panel in the dropped position.

The driver's and passenger's side pump panels shall be removable and fastened with swell type fasteners.

PUMP COMPARTMENT LIGHT

A pump compartment light shall be provided inside the right side pump enclosure and accessible through a door on the pump panel.

A .125" weep hole shall be provided in each light lens, preventing moisture retention.

Engine monitoring graduated LED indicators shall be incorporated with the pressure controller.

Also provided at the pump panel shall be the following:

- Master Pump Drain Control

AIR HORN BUTTON

An air horn control button shall be provided at the pump operator's control panel. This button shall be red in color and properly labeled and put within easy reach of the operator.

VACUUM AND PRESSURE GAUGES

The pump vacuum and pressure gauges shall be liquid filled with Sub Z2 freeze proof and manufactured by Class 1, Inc.

The gauges shall be a minimum of 4.50" in diameter with white faces and black lettering.

The master intake gauge shall have a pressure range of 30"-0-600 PSI.

The master discharge pressure gauge shall indicate both water and foam pressure and have a range of 0-600 PSI.

The pump pressure and intake gauges shall be installed adjacent to each other at the pump operator's control panel.

Test port connections shall be provided at the pump operator's panel. One shall be connected to the intake side of the pump, and the other to the discharge manifold of the pump. They shall have 0.25 in. standard pipe thread connections and polished stainless steel plugs. They shall be marked with a label.

PRESSURE GAUGES

The individual "line" pressure gauges for the discharges shall be interlube filled and manufactured by Class 1©.

They shall be a minimum of 2.00" in diameter and shall have white faces with black lettering.

Gauge construction shall include a Zytel nylon case with adhesive mounting gasket and threaded retaining nut.

Gauges shall have a pressure range of 30"-0-400#.

The individual pressure gauge shall be installed as close to the outlet control as practical.

This gauge shall include a 10 year warranty against leakage, pointer defect, and defective bourdon tube.

WATER LEVEL GAUGE

A Fire Research, Model WL2000 series electric water level gauge shall be provided on the operator's panel, that registers water level by means of 9 LEDs. They shall be at 1/8 level increments with a tank empty LED. The LEDs shall be a bright type that is readable in sunlight, and have a full 180 degree of clear viewing.

To further alert the pump operator, shall have a warning flash when the tank volume is less than 25%, and shall have "Down Chasing LEDs when the tank is almost empty.

The level measurement shall be ascertained by sensing the head pressure of the fluid in the tank or cell.

WATER LEVEL GAUGE

There shall be two (2) additional water level indicator, Whelen®, Model PSTANK, LED module installed one (1) each side rearward of crew cab doors.

This light module shall include four (4) colored levels, and function similar to the water level indicator located at the operators panel:

- First green module indicates a full water level
- Second blue module indicates a water level above 3/4 full
- Third amber module indicates a water level above 1/2 full
- Last red module indicates a water level above 1/4 full and empty
    - Above 1/4 this light shall be steady burning
    - At empty this light shall be flashing

This module shall be activated when the battery switch is on.

FOAM LEVEL GAUGE

An electronic foam level gauge shall be provided on the operator's panel that registers foam level by means of five (5) colored LED lights. The lights shall be durable, ultra-bright five (5) LED design viewable through 180 degrees. The foam level indicators shall be as follows:

- 100 percent = Green
- 75 percent = Yellow
- 50 percent = Yellow
- 25 percent = Yellow
- Refill = Red

The light shall flash when the level drops below the given level indicator to provide an eighth of a tank indication. To further alert the pump operator, the lights shall flash sequentially when the foam tank is empty.

The level measurement shall be based on the sensing of head pressure of the fluid in the tank.

The display shall be constructed of a solid plastic material with a chrome plated die cast bezel to reduce vibrations that can cause broken wires and loose electronic components. The encapsulated design shall provide complete protection from foam and environmental elements. An industrial pressure transducer shall be mounted to the outside of the tank. The display shall be able to be calibrated in the field and shall measure head pressure to accurately show the tank level.

LIGHT SHIELDS

Illumination shall be provided at each pump control panel for controls, switches, essential instructions, gauges, and instruments necessary for the operation of the apparatus and the equipment provided on it. External illumination shall be a minimum of five (5) foot-candles on the face of the device. Internal illumination shall be a minimum of four (4) foot-lamberts.

Lights shall be installed under a stainless steel shield. A light shall come on above the pump panel light switch when the parking brake is set. This is to afford the operator some illumination when first approaching the control panel. A green pump engaged indicator shall come on at the operator's panel when the pump is shifted into gear from inside the cab. One pump panel light shall also come on at the operator's panel when the pump is in "ok to pump" mode. The remaining lights to be actuated from a switch located on the pump panel.

ADDITIONAL STEP/LIGHT SHIELD

There shall be an additional aluminum treadplate stepping surface no less than 12.00" deep and properly reinforced to support a man's weight, installed over the driver's side pump panel.

- There shall be On Scene Solutions 12 volt DC white LED strip lights installed under the step to illuminate the controls, switches, essential instructions, gauges, and instruments necessary for the operation of the apparatus. These lights shall be activated by the pump panel light switch.

There shall be one (1) white LED, step light provided above the step. In order to ensure exceptional illumination, each step light shall provide a minimum of 25 foot-candles (fc) covering an entire 15" x 15" square placed ten (10) inches below the light and a minimum of 1.5 fc covering an entire 30" x 30" square at the same ten (10) inch distance below the light. The step light shall be activated by the pump panel light switch.

The step shall include a Morton Cass® cross-hatch grating insert as large as possible.

ADDITIONAL STEP/LIGHT SHIELD

There shall be an additional aluminum treadplate stepping surface no less than 12.00" deep and properly reinforced to support a man's weight, installed over the passenger's side pump panel.

- There shall be On Scene Solutions 12 volt DC white LED strip lights installed under the step to illuminate the controls, switches, essential

instructions, gauges, and instruments necessary for the operation of the apparatus. These lights shall be activated by the pump panel light switch.

There shall be one (1) white LED, step light provided above the step. In order to ensure exceptional illumination, each step light shall provide a minimum of 25 foot-candles (fc) covering an entire 15" x 15" square placed ten (10) inches below the light and a minimum of 1.5 fc covering an entire 30" x 30" square at the same ten (10) inch distance below the light. The step light shall be activated by the pump panel light switch.

The step shall include a Morton Cass® cross-hatch grating insert as large as possible.

AIR HORN SYSTEM

There shall be two (2) Grover, air horns provided and located in the front bumper, recessed to the outside of the frames. The horn system shall be piped to the air brake system wet tank utilizing 0.38" tubing. A pressure protection valve shall be installed in-line to prevent loss of air in the air brake system.

AIR HORN CONTROL

Two (2) lanyard rope pull controls shall be provided, one (1) within reach of the driver and one (1) within reach of the officer.

ELECTRONIC SIREN

A Whelen®, Model 295SLSA1, electronic siren with noise canceling microphone shall be provided.

This siren to be active when the battery switch is on and that emergency master switch is on.

Siren head shall be located on a swivel bracket mounted on the headliner so that it is accessible to both the driver and officer. The swivel bracket shall be capable of rotating a minimum of 180 degrees.

The electronic siren shall be controlled on the siren head only. No horn button or foot switches shall be required.

SPEAKER

There shall be two (2) speakers provided. Each speaker shall be a Whelen®, Model SA315P, black nylon composite, 100-watt, with through bumper mounting brackets and polished stainless steel grille. Each speaker shall be connected to the siren amplifier.

The speaker(s) shall be recessed in the center of the front bumper.

AUXILIARY MECHANICAL SIREN

A Federal Q2B® siren shall be furnished. A siren brake button shall be installed on the switch panel.

The control solenoid shall be powered up after the emergency master switch is activated.

The mechanical siren shall be recessed in the front bumper in the center. The siren shall be supported by the bumper framework.

The mechanical siren shall be actuated by a foot switch on the officer's side and foot switch on the drivers side.

CAB ROOF LIGHTBAR

There shall be a 72.00" Whelen Freedom, Model FN**QLED, lightbar mounted on the cab roof.

The lightbar shall include the following:

- Eight (8) red flashing forward facing LED modules.
- Two (2) red flashing front corner LED modules.
- One (1) red flashing driver end LED module.
- One (1) red flashing pass end LED module.

The lens color shall be clear .

There shall be a switch located on a switch panel in the cab to control this lightbar.

CAB ROOF SIDE LIGHTBARS

There shall be two (2) 24.00" Whelen, Model Freedom mini LED lightbars mounted on the roof, one (1) on each side, over the crew cab doors.

Each lightbar shall include the following:

- One (1) red flashing front corner LED module.
- One (1) red flashing rear corner LED module.
- One (1) red flashing LED module facing the outside.

These lightbars shall be activated with the rear upper warning switch.

Each lightbar shall be furnished with clear.

CAB FACE WARNING LIGHTS

There shall be two (2) Whelen, Model M6*C, LED flashing warning lights with chrome flange provided on the front of the cab above the headlights.

- The driver's side front warning light to be red.
- The passenger's side front warning light to be red.

Both lights shall include a clear lens.

There shall be a switch located in the cab on the switch panel to control the lights.

SIDE ZONE LOWER LIGHTING

There shall be six (6) Whelen®, Model M6*C, LED flashing warning lights with Model 6EFLANGE, chrome flanges located in the following positions:

- Two (2) lights, one (1) each side on the bumper extension
  - The side front lights to be red
- Two (2) lights, one (1) each side of cab rearward of crew cab doors
  - The side middle lights to be red
- Two (2) lights, one (1) each side above rear wheels
  - The side rear lights to be red

All six (6) lights shall include a clear lens.

There shall be a switch located in the cab on the switch panel to control the lights.

REAR ZONE LOWER LIGHTING

There shall be two (2) Whelen®, Model M6*C, LED flashing warning lights located at the rear of the apparatus.

- The driver's side rear light to be red
- The passenger's side rear light to be red

Both lights shall include a lens that is clear.

There shall be a switch located in the cab on the switch panel to control the lights.

REAR OF HOSEBED WARNING LIGHTS

There shall be two (2) Whelen, Model B63M7**, LED Rota-Beam, beacons with Model M7**, lower LED flashing lights provided in a single polished aluminum housing at the rear of the truck.

There shall be one (1) installed on the driver's side with the lower light to the rear:

- The driver's side beacon to include red LED's.
- The rear upper light(s) on the driver's side to be red.

There shall be one (1) installed on the passenger's side with the lower light to the rear:

- The passenger's side beacon to include red LED's.
- The rear upper light(s) on the passenger's side to be red.

The color of the lenses for all the LED's to be clear.

There shall be a switch located in the cab on the switch panel to control the lights.

The lower light may be load managed when the parking brake is applied.

The rear warning lights shall be mounted on stainless steel brackets with all wiring totally enclosed. These brackets shall also support the clearance/marker lights.

TRAFFIC DIRECTING LIGHT

There shall be one (1) Whelen model TAM85, 46.00" long x 2.84" high x 2.24" deep, amber LED traffic directing light installed at the rear of the apparatus.

The Whelen model TACTLD1 control head shall be included with this installation.

The auxiliary warning mode shall be activated with the control head only.

This traffic directing light shall be recessed with a treadplate trim plate at the rear of the apparatus as high as practical.

The traffic directing light control head shall be located within a heavy duty swivel bracket centered between the driver and passenger.

This swivel bracket shall enable the driver access as well as the passenger.

ELECTRICAL SYSTEM GENERAL DESIGN FOR ALTERNATING CURRENT

The following guidelines shall apply to the 120/240 VAC system installation:

General

Any fixed line voltage power source producing alternating current (ac) line voltage shall produce electric power at 60 cycles plus or minus 3 cycles.

Except where superseded by the requirements of NFPA 1901, all components, equipment and installation procedures shall conform to NFPA 70, National Electrical Code (herein referred to as the NEC).

Line voltage electrical system equipment and materials included on the apparatus shall be listed and installed in accordance with the manufacturer's instructions. All products shall be used only in the manner for which they have been listed.

Grounding

Grounding shall be in accordance with Section 250-6 "Portable and Vehicle Mounted Generators" of the NEC. Ungrounded systems shall not be used. Only stranded or braided copper conductors shall be used for grounding and bonding.

An equipment grounding means shall be provided in accordance with Section 250-91 (Grounding Conductor Material) of the NEC.

The grounded current carrying conductor (neutral) shall be insulated from the equipment grounding conductors and from the equipment enclosures and other grounded parts. The neutral conductor shall be colored white or gray in accordance with Section 200-6 (Means of Identifying Grounding Conductors) of the NEC.

In addition to the bonding required for the low voltage return current, each body and driving or crew compartment enclosure shall be bonded to the vehicle frame by a copper conductor. This conductor shall have a minimum amperage rating of 115 percent of the nameplate current rating of the power source specification label as defined in Section 310-15 (amp capacities) of the NEC. A single conductor properly sized to meet the low voltage and line voltage requirements shall be permitted to be used.

All power source system mechanical and electrical components shall be sized to support the continuous duty nameplate rating of the power source.

Operation

Instructions that provide the operator with the essential power source operating instructions, including the power-up and power-down sequence, shall be permanently attached to the apparatus at any point where such operations can take place.

Provisions shall be made for quickly and easily placing the power source into operation. The control shall be marked to indicate when it is correctly positioned for power source operation. Any control device used in the drive train shall be equipped

with a means to prevent the unintentional movement of the control device from its set position.

A power source specification label shall be permanently attached to the apparatus near the operator's control station. The label shall provide the operator with the information detailed in Figure 19-4.10.

Direct drive (PTO) and portable generator installations shall comply with Article 445 (Generators) of the NEC.

Overcurrent protection

The conductors used in the power supply assembly between the output terminals of the power source and the main over current protection device shall not exceed 144.00" (3658 mm) in length.

For fixed power supplies, all conductors in the power supply assembly shall be type THHW, THW, or use stranded conductors enclosed in nonmetallic liquid tight flexible conduit rated for a minimum of 194 degree Fahrenheit (90 degrees Celsius).

For portable power supplies, conductors located between the power source and the line side of the main overcurrent protection device shall be type SO or type SEO with suffix WA flexible cord rated for 600-volts at 194 degrees Fahrenheit (90 degrees Celsius).

Wiring Methods

Fixed wiring systems shall be limited to the following:

- Metallic or nonmetallic liquid tight flexible conduit rated at not less than 194 degrees Fahrenheit (90 degrees Celsius)
- or
- Type SO or Type SEO cord with a WA suffix, rated at 600 volts at not less than 194 degrees Fahrenheit (90 degrees Celsius)

Electrical cord or conduit shall not be attached to chassis suspension components, water or fuel lines, air or air brake lines, fire pump piping, hydraulic lines, exhaust system components, or low voltage wiring. In addition the wiring shall be run as follows.

- Separated by a minimum of 12.00" (305 mm), or properly shielded, from exhaust piping
- Separated from fuel lines by a minimum of 6.00" (152 mm) distance

Electrical cord or conduit shall be supported within 6.00" (152 mm) of any junction box and at a minimum of every 24.00" (610 mm) of continuous run. Supports shall be made of nonmetallic materials or corrosion protected metal. All supports shall be of a design that does not cut or abrade the conduit or cable and shall be mechanically fastened to the vehicle.

Wiring Identification

All line voltage conductors located in the main panel board shall be individually and permanently identified. The identification shall reference the wiring schematic or indicate the final termination point. When prewiring for future power sources or devices, the unterminated ends shall be labeled showing function and wire size.

Wet Locations

All wet location receptacle outlets and inlet devices, including those on hardwired remote power distribution boxes, shall be of the grounding type provided with a wet location cover and installed in accordance with Section 210-7 "Receptacles and Cord Connections" of the NEC.

All receptacles located in a wet location shall be not less than 24.00" (610 mm) from the ground. Receptacles on off-road vehicles shall be a minimum of 30.00" (762 mm) from the ground.

The face of any wet location receptacle shall be installed in a plane from vertical to not more than 45 degrees off vertical. No receptacle shall be installed in a face up position.

Dry Locations

All receptacles located in a dry location shall be of the grounding type. Receptacles shall be not less than 30.00" (762 mm) above the interior floor height.

All receptacles shall be marked with the type of line voltage (120-volts or 240-volts) and the current rating in amps. If the receptacles are direct current, or other than single phase, they shall be so marked.

Listing

All receptacles and electrical inlet devices shall be listed to UL 498, Standard for Safety Attachment Plugs and Receptacles, or other appropriate performance standards. Receptacles used for direct current voltages shall be rated for the appropriate service.

The prime mover shall be started from a cold start condition and the line voltage electrical system loaded to 100 percent of the nameplate rating.

The power source shall be operated at 100 percent of its nameplate voltage for a minimum of two (2) hours unless the system meets category certification as defined in the current NFPA 1901 standard.

Where the line voltage power is derived from the vehicle's low voltage system, the minimum continuous electrical load as defined in the current NFPA 1901 standard shall be applied to the low voltage electrical system during the operational test.

GENERATOR

The apparatus shall be equipped with a complete electrical power system. The generator shall be a Harrison Model MCR Stealth 10.0 kW Hydraulic unit. The wiring and generator installation shall conform to the present National Electrical Codes Standards of the National Fire Protection Association. The installation shall be designed for continuous operation without overheating and undue stress on components.

Generator Performance

- Continuous Duty Rating: 10,000 watts

- Nominal Volts: 120/240

- Amperage: 80 @ 120 volts, 40 @ 240 volts

- Phase: Single

- Cycles: 60 hertz

- Engine Speed at Engagement: Idle

- RPM range: 900 to 3,000 (hydraulic pump)

The output of the generator shall be controlled by an internal hydraulic system. An electrical instrument gauge panel shall be provided for the operator to monitor and control all electrical operations and output.

The generator shall be driven by a transmission power take off unit, through a hydraulic pump and motor.

The generator shall include an electrical control inside the cab. The hydraulic engagement supply shall be operational only after the chassis parking brake is applied.

An electric/hydraulic valve shall supply hydraulic fluid to the clutch engagement unit provided on the chassis PTO drive.

Generator Instruments and Controls

To properly monitor the generator performance a digital meter panel shall be furnished and mounted next to the circuit breaker panel. The meter shall indicate the following items:

- Voltage

- Amperage for both lines

- Frequency

- Generator run hours

- Over current indication

- Over temperature indication

- "Power On" indication

- Two (2) fuse holders with two (2) amp fuses (for indicator light protection)

The meter and indicators shall be installed near eye level in the compartment. Instruments shall be flush mounted in an appropriate sized weatherproof electrical enclosure. All instruments used shall be accurate within +/- two (2) percent.

Generator Wiring:

The system shall be installed by highly qualified electrical technicians to assure the required level of safety and protection to the fire apparatus operators. The wiring, electrical fixtures and components shall be to the highest industry quality standards available on the domestic market. The equipment shall be the type as designed for mobile type installations subject to vibration, moisture and severe continuous usage. The following electrical components shall be the minimum acceptable quality standards for this apparatus:

Wiring:

All electrical wiring shall be fine stranded copper type. The wire shall be sized to the load and circuit breaker rating; ten (10) gauge on 30 amp circuits, 12 gauge on 20 amp circuits and 14 gauge on 15 amp circuits. The cable shall be run in corner areas and extruded aluminum pathways built into the body for easy access.

Load Center:

The main load center shall be a Cutler Hammer with circuit breakers rated to load demand.

Circuit Breakers:

Individual breakers shall be provided for all on-line equipment to isolate a tripped breaker from affecting any other on-line equipment.

GENERATOR LOCATION

The generator shall be mounted in the in the area over the pump on the right side. The flooring in this area shall be either reinforced or constructed in such a manner that it shall handle the additional weight of the generator.

GENERATOR START

There shall be a switch provided on the cab instrument panel to engage the generator.

CIRCUIT BREAKER PANEL

The circuit breaker panel shall be located high on the forward wall of compartment D3.

LED Light Tower

One (1) Will-Burt Powerlite model NS3.0-600WHL extendible lighting system shall be installed rear cab roof mounted side to side and hinged to driver. The lighting is provided by a Will-Burt 12 volt DC RPC directional lighting system with rotation and tilt quartz halogen lamps to provide total coverage. The tower pneumatically extends vertically up to 10 feet. The remote control unit allows you to operate all Night Scan functions and accurately aim for complete directional positioning. In addition, AutoStow, a one button command, automatically retracts, turns out the lights and stows the entire system to the compact horizontal transporting position.

• The operational envelope of the light mast shall be automatically illuminated whenever the mast is being raised, lowered with the required NFPA look-up light.

• The lighting system shall include four (4) 150 watt 120 volt Whelen Pioneer PFP2AC LED light fixtures with an output of 14,000 lumens each.

• One button adjustable AutoStow provides error-free convenience to retract and stow system and shut off the lights automatically when being stowed.

• Heavy duty aluminum and stainless steel weatherproof construction provides long life for components exposed to water and weather.

• A hand held pistol grip remote control on a 25 ft. cord controls the aiming of lights. The up/down switch and AutoStow switch, which allows for quick and accurate pointing of lights and raising of light tower and automatically shuts off the lights when being stowed. The control shall be located next to the breaker box.

• Full 360 degrees of lighting coverage provides complete lighting coverage of emergency or work scene.

The overall size of nested light tower shall be approximately 44-1/2" wide x 62-5/8" long x 11-5/8" high.

Light Tower Control Location

Relocate light tower controls in place of standard placement. Location: officer side upper corner of top mount pump panel.

ELECTRIC CORD REEL

Furnished with the 120 volt AC electrical system shall be a Hannay, Series 1600, cord reel. The reel shall be provided with a 12 volt electric rewind switch that is guarded to prevent accidental operation and labeled for its intended use. The switch shall be protected with a fuse and installed at a height not to exceed 72.00" above the operators standing position.

The exterior finish of the reel(s) shall be painted #269 gray from the reel manufacturer.

A captive roller assembly to be provided to aid in the payout and loading of the reel. A ball stop shall be provided to prevent the cord from being wound on the reel.

A label shall be provided in a readily visible location adjacent to the reel. The label shall indicate current rating, current type, phase, voltage and total cable length.

A total of two (2) cord reels shall be provided above the pump area on the left side and above the pump area on the right side.

The cord reel should be configured with three (3) conductors.

CORD

Provided for electric distribution shall be two (2) lengths, one (1) for each reel, of 250 feet of yellow 10/3 electrical cord, weather resistant 105 degree Celsius to -50 degree Celsius, 600 volt jacketed SOOW cord. A Hubbell 5-20, 20 amp, 120 volt, straight blade connector body shall be installed on the end of the cord.

PORTABLE JUNCTION BOX

There shall be a total of two (2) electrical junction box(es), listed for use in wet locations and provided with light to indicate power on. Each box shall be designed to keep the exterior electrical components above 2.00" of standing water, protected from corrosion, and capable of being carried with a gloved hand.

There shall be a cable strain relief and direct connection, no plug provided for each box. Each box shall be yellow powder coated .

Each Circle D, PF51G Series, box shall be provided with the following receptacles:

- Four (4) 120 vac, 20 amp single straight blade receptacles

120 VOLT RECEPTACLE

There shall be two (2), 15 amp 120 volt AC three (3) wire twist lock receptacle(s) with waterproof flip up cover(s) installed in the cab (2). The NEMA configuration for the receptacles shall be L5-15R.

The receptacle(s) shall be powered from the generator.

There shall be a label installed near the receptacle(s) that state the following:

- Line Voltage
- Current Ratting (amps)
- Phase
- Frequency
- Power Source

PAINT

The exterior custom cab and body painting procedure shall consist of a seven (7) step finishing process as follows:

1. Manual Surface Preparation - All exposed metal surfaces on the custom cab and body shall be thoroughly cleaned and prepared for painting. Imperfections on the exterior surfaces shall be removed and sanded to a smooth finish. Exterior seams shall be sealed before painting. Exterior surfaces that shall not be painted include; chrome plating, polished stainless steel, anodized aluminum and bright aluminum treadplate.
2. Chemical Cleaning and Pretreatment - All surfaces shall be chemically cleaned to remove dirt, oil, grease, and metal oxides to ensure the subsequent coatings bond well. The aluminum surfaces shall be properly cleaned and treated using a high pressure, high temperature 4 step Acid Etch process.

The steel and stainless surfaces shall be properly cleaned and treated using a high temperature 3 step process specifically designed for steel or stainless. The chemical treatment converts the metal surface to a passive condition to help prevent corrosion. A final pure water rinse shall be applied to all metal surfaces.

3. Surfacer Primer - The Surfacer Primer shall be applied to a chemically treated metal surface to provide a strong corrosion protective basecoat. A minimum thickness of 2 mils of Surfacer Primer is applied to surfaces that require a Critical aesthetic finish. The Surfacer Primer is a two-component high solids urethane that has excellent sanding properties and an extra smooth finish when sanded.
4. Finish Sanding - The Surfacer Primer shall be sanded with a fine grit abrasive to achieve an ultra-smooth finish. This sanding process is critical to produce the smooth mirror like finish in the topcoat.
5. Sealer Primer - The Sealer Primer is applied prior to the Basecoat in all areas that have not been previously primed with the Surfacer Primer. The Sealer Primer is a two-component high solids urethane that goes on smooth and provides excellent gloss hold out when topcoated.
6. Basecoat Paint - Two coats of a high performance, two component high solids polyurethane basecoat shall be applied. The Basecoat shall be applied to a thickness that shall achieve the proper color match. The Basecoat shall be used in conjunction with a urethane clear coat to provide protection from the environment.
7. Clear Coat - Two (2) coats of Clear Coat shall be applied over the Basecoat color. The Clear Coat is a two-component high solids urethane that provides superior gloss and durability to the exterior surfaces. Lap style and roll-up doors shall be Clear Coated to match the body. Paint warranty for the roll-up doors shall be provided by the roll-up door manufacture.

All removable items such as brackets, compartment doors, door hinges, and trim shall be removed and separately if required, to ensure paint behind all mounted items. Body assemblies that cannot be finish painted after assembly shall be finish painted before assembly.

The cab shall be two-tone, with the upper section painted #101 black along with a shield design on the cab face and lower section of the cab and body painted Yellow.

PAINT - ENVIRONMENTAL IMPACT

Contractor shall meet or exceed all current State regulations concerning paint operations. Pollution control shall include measures to protect the atmosphere, water and soil. Controls shall include the following conditions:

- Topcoats and primers shall be chrome and lead free.
- Metal treatment chemicals shall be chrome free. The wastewater generated in the metal treatment process shall be treated on-site to remove any other heavy metals.
- Particulate emission collection from sanding operations shall have a 99.99% efficiency factor.
- Particulate emissions from painting operations shall be collected by a dry filter or water wash process. If the dry filter is used, it shall have an efficiency rating of 98.00%. Water wash systems shall be 99.97% efficient
- Water from water wash booths shall be reused. Solids shall be removed on a continual basis to keep the water clean.
- Paint wastes are disposed of in an environmentally safe manner.
- Empty metal paint containers shall be to recover the metal.
- Solvents used in clean-up operations shall be recycled on-site or sent off-site for distillation and returned for reuse.

Additionally, the finished apparatus shall not be manufactured with or contain products that have ozone depleting substances. Contractor shall, upon demand, present evidence that the manufacturing facility meets the above conditions and that it is in compliance with his State EPA rules and regulations.

PAINT CHASSIS FRAME ASSEMBLY

The chassis frame assembly shall be painted black before the installation of the cab and body, and before installation of the engine and transmission assembly, air brake lines, electrical wire harnesses, etc.

Components that are included with the chassis frame assembly that shall be painted are:

- Frame rails
- Frame liners
- Cross members
- Axles
- Suspensions
- Steering gear
- Battery boxes
- Bumper extension weldment
- Frame extensions
- Body mounting angles

- Rear Body support substructure (front and rear)
- Pump house substructure
- Air tanks
- Fuel tank
- Castings
- Individual piece parts used in chassis and body assembly

Components treated with epoxy E-coat protection prior to paint:

- Two (2) C-channel frame rails
- Two (2) frame liners

The E-coat process shall meet the technical properties shown.

COMPARTMENT INTERIOR PAINT

The interior of compartmentation shall be painted with a gray spatter type paint.

REFLECTIVE BAND

A 10.00" black reflective band shall be provided across the front of the vehicle and along the sides of the body.

The reflective band provided on the cab face shall be at the headlight level.

CHEVRON STRIPING, REAR

There shall be alternating chevron striping located on the rear-facing vertical surface of the apparatus. The rear surface, excluding the rear compartment door, shall be covered.

The colors shall be red and fluorescent yellow diamond grade.

Each stripe shall be 6.00" in width.

This shall meet the requirements of NFPA 1901, 2009 edition, which states that 50% of the rear surface shall be covered with chevron striping.

REFLECTIVE STRIPE, CAB DOORS

A 6.00" x 16.00" black reflective stripe shall be provided across the interior of each cab door. The stripe shall be located approximately 1.00" up from the bottom, on the door panel.

This stripe shall meet the NFPA 1901 requirement.

LETTERING

The lettering shall be 22 karat gold vinyl.

LETTERING

Eighty-one (81) to one hundred (100) Sign Gold lettering, 3.00" high, with highlight and shade shall be provided.

SECTION 2 - OPTION C
SEAGRAVE MARAUDER II CAB & CHASSIS

GENERAL

Chassis shall be a new, heavy-duty, custom fire apparatus design built expressly for the fire service. All standard components that have not been specified shall be provided.

Chassis shall be designed, engineered and built by the bidder and be the manufacturer's first line custom chassis.

The chassis shall be suitable for heavy duty service with all components having adequate strength and capacity for the intended load to be sustained and the type of service required.

WHEELBASE

The wheelbase shall be: **212" inches or less**

SEATING CAPACITY

The safe seating capacity of the cab for properly belted passengers shall be: For six (6)

APPROACH - DEPARTURE ANGLES

An angle of approach and an angle of departure of at least 8 degrees shall be maintained at the front and the rear of the vehicle when it is loaded to the estimated in-service weight, as defined by NFPA 1901 2009 edition.

FRAME

The chassis frame shall be built with two variable section steel channels with a minimum of six (6) crossmembers. Pump shall not be counted as a crossmember. The side rails shall be of heat treated steel with tapering measurements. Each rail shall have a section modulus of 21.7, a minimum elastic limit of 120,000 PSI and a minimum resisting bending moment of 2,601,600 inch pounds. The crossmembers shall be of heavy duty, fabricated, all-welded design, made out of a minimum of 50,000 psi material. The frame and cross members shall be a bolted assembly utilizing 1/2" flange head grade eight bolts and Spiralock flange nuts. Spiralock nuts shall be used exclusively in the frame assembly for mounting spring hangers, steering gear, engine, transmission, etc. because of their ability to maintain a constant torque tension and prevent vibration loosening.

Their design shall provide for an even thread load distribution over

the bolt, increased fatigue strength and life, and clamping torque. All holes made must be used and any holes in the frame for options not required on this chassis are not acceptable. The frame rails shall receive a duo-coat primer: an E-coat followed by a powder coating. This duo-coat process meets 1000 hours of salt spray testing per ASTM B117 test procedure.

BUMPER

A heavy duty 10-1/4" high x 1/4" thick painted steel bumper shall be mounted to the front of the chassis and be fabricated in the factory of the bidder. The bumper shall be channel shaped with 2" flanges and its ends shall be angled 45 degrees for a distance of 5".

As part of the bumper extension, a second formed channel with 2" flanges shall be provided directly behind the full width of the flat portion of the bumper. The bumper extension support shall be of channel (minimum 9-7/16" x 3" x 3/8") construction, bolted to the chassis frame stub. A 3/16" aluminum treadplate gravel pan (deck) contoured to fit just below the front face of the cab and just below the upper bumper flange shall be provided. The gravel pan shall not be fastened to the top flange of the bumper. The bumper shall be painted gloss black.

18" BUMPER EXTENSION

A bumper extension shall be installed at the front of the cab. The front of the bumper shall be approximately 18" from the front face of the cab. A gravel pan made of 3/16" aluminum treadplate shall be installed between the front bumper and the cab. The bumper extension shall be designed and constructed so that the apparatus can be pulled by the extension.

LIFTABLE AND TOWABLE BUMPER EXTENSION

The bumper extension shall be designed and constructed so that the apparatus can be lifted and towed by the extension.

FRONT BUMPER TROUGH - CENTER

A bumper trough shall be installed in the center of the bumper extension. It shall have interior dimensions of 11.75" wide x 27.25" long x 13" deep. It shall be constructed of smooth aluminum and be easily removable from the gravel pan. Drain holes shall be provided.

BUMPER OPENING FOR FRONT SUCTION

An opening shall be provided in the right side of the bumper for a thru-bumper front suction. Black Dri-Dek shall be provided in the bottom of one (1)front bumper compartment(s).

HINGED ALUM COVER WITH PRECONNECT NOTCH

The hose trough shall be provided with a hinged aluminum cover. The cover shall be notched on one end for the preconnect. A handle, gas cylinder type hold open (and closed) device and stainless steel butterfly latch shall be provided for the door.

FRONT TOW HOOKS

Two (2) painted tow hooks shall be furnished below the bumper securely attached to the bumper support.

REAR TOW LOOPS

Two (2) painted rear tow loops shall be provided, welded to the underside of the rear step subframe.
The loops shall be rated at 9000 pounds straight pull.

STEERING

A Ross model TAS-85 integral heavy duty power steering system shall be provided. The hydraulic pump shall be engine gear driven. The steering gear "box", or fixture that the gear is mounted to, shall be fabricated in the factory of the bidder. It shall be a welded assembly constructed of 3/8" formed steel with a 3/4" face plate. Vertical gussets shall be provided between the face plate and the frame mounting plate to insure against frame flex while the vehicle is stationary.

AUXILIARY CYLINDER FOR POWER STEERING

An auxiliary power assist cylinder shall be provided in the power steering system.

CHASSIS ALIGNMENT

The chassis frame rails shall be cross checked for length and square. Front and rear axles shall be laser aligned. The front axle shall be aligned and toe-in and caster set on the front tires at the manufacturer's facility. The completed apparatus should be rechecked for proper alignment after the chassis has been fully

loaded.

AIR PIPING

The service brake system shall be full air type. The system is to meet or exceed current FMVSS-121 requirements. Other components or accessories shall be as follows:

Pressure protection valve
Quick build up system
Engine mounted, gear driven air compressor
Bendix Model E-6 dual circuit brake treadle valve
Two (2) air pressure gauges on cab dash with indicator light and buzzer
One (1) Bendix DV2 automatic drain valve on wet tank
Manual drain valves on remaining air reservoirs
Air reservoirs

The Bendix SR-7 valve, in conjunction with the double check valve, shall enable modulation of the spring brakes in the event of a service brake air system failure to allow the vehicle to be stopped.
Brake piping shall consist of SAE approved, DOT rated "Synflex" reinforced colored nylon tubing. The lines shall be wrapped in a heat protective loom where necessary in the chassis.
Braided hoses shall provide flexibility between axle and frame connections. Brake air lines shall be color-coded. Air inlet to air brake compressor shall be from the engine intake manifold, i.e. after transition through the engine air cleaner. A flexible stainless steel braided Teflon hose shall be provided from the compressor to the air dryer.

The parking brake system is to be the spring set type operated by control valve on driver's console. A brake indicator light shall also be provided.

AIR DRYER

A Meritor WABCO 1200 System Saver air dryer shall be installed in the air brake system. It shall have a minimum capacity of 30 cfm air flow. Dryer shall be equipped with an integral, automatic, 12 volt heated moisture ejector which is thermostatically controlled. System shall include a pressure controlled check valve installed between the wet tank and the secondary air reservoir.

AUXILIARY AIR INLET

There shall be an auxiliary air inlet installed to maintain the chassis air pressure while the engine is not running. A check valve shall be installed in the line to prevent outflow of air pressure from the "wet" or "supply" tank.

FRONT AXLE

A Meritor MFS front axle with a 22,800 pound rating shall be provided. It shall include composite low-friction bushings with diagonal grooves to better distribute lube, camber settings of +1/4 degree for both left and right sides to help improve tire life and a large diameter, heat treated kingpin with a lube retaining seal.

DISC BRAKES

The front axle shall be provided with Meritor #EX225H air disc brakes with internal automatic adjustment, sealed synchronized twin pistons and robust sealing of slide pins for environmental protection. The #EX225H air disc brakes shall have 17" rotors and a fully sealed lever mechanism with variable mechanical ratio. A visual indicator of brake wear shall also be provided.

FRONT SEMI-ELLIPTICAL SPRING SUSPENSION, 4" X 52"

The front suspension shall be semi-elliptical 4" x 52" constant rate type springs with a military wrapped eye. The correct material, spring length, width, thickness and number shall be provided to match the leaf spring rating with that of the gross axle weight rating of the vehicle.

SHOCK ABSORBERS

Gabriel heavy-duty telescoping shock absorbers shall also be provided on the front axle.

REAR AXLE

The rear axle shall be a Meritor model RS30-185 with a capacity of 31,500 pounds at the hub. The rear axle shall include 16-1/2" x 7" S-Cam brakes with dust shields and automatic slack adjusters. Stroke indicators shall be incorporated to provide a visual indicator of brake wear.
All axles shall be purchased complete from and certified by the axle manufacturer for the specific application. Brake chamber brand and size shall be determined by the axle manufacturer.

ROAD SPEED

Per NFPA, the maximum top road speed shall be 60 mph at the governed engine RPM..

ANTI-LOCK BRAKING SYSTEM (ABS)

The vehicle shall be equipped with a WABCO 4S4M anti-lock braking system (ABS). The ABS shall provide four (4) channel anti-lock-up braking control on the (2) front and (2) rear wheels. The system shall employ a digital electronics system with microprocessor controls divided into two (2) diagonal circuits. In the event of one circuit malfunction the second circuit shall operate unaffected. Each wheel shall be constantly monitored by the system when the vehicle is in motion. When any wheel begins to lock-up during braking, a signal shall be transmitted to the processor from the wheel sensor. The control unit shall instantly reduce the braking force applied to the wheel and immediately re-apply braking force so that the wheel rapidly slows without locking. The system shall control all wheels simultaneously to provide maximum vehicle braking in a relatively straight line.

An ABS warning light shall be installed in the warning light panel of the driver's dash.

The ABS system shall automatically disengage the auxiliary braking system whenever the anti-lock braking mode is active.

VEHICLE STABILITY COMPLIANCE – ELECTRONIC CONTROL

In compliance with NFPA 1901-2009 Edition standard 4.13.1, the vehicle, as specified, shall be equipped with a Meritor-WABCO electronic Roll Stability Control system that shall utilize a centrally mounted pitch and yaw sensor and steering shaft position sensor interacting with the chassis' ABS traction control, auxiliary braking system and the engine ECM to minimize the vehicle's potential for rollover in a turning at speed maneuver.

AUTOMATIC TRACTION CONTROL WITH DEEP SNOW AND MUD SWITCH

Automatic Traction Control, working in concert with the ABS system, shall be provided which shall reduce wheel slip on acceleration on wet or slippery road conditions. A light shall illuminate on the driver's dash when the drive wheels slip during

acceleration.

A deep snow and mud option switch shall be provided in addition to the ATC option. This function increases available traction on extra soft surfaces like snow, mud or gravel by slightly increasing the permissible wheel spin.

ONSPOT AUTOMATIC SNOW CHAINS

Onspot automatic snow chains shall be provided in front of the rear axle of the vehicle. An electric switch shall be mounted in the cab to provide 12 volts to an air solenoid mounted on the vehicles frame. Compressed air to the solenoid from the vehicle's onboard air system shall activate the chains. When the chains are deactivated, the solenoid exhausts the air provided to the chain units and self-contained return springs bring the chain wheels back to their nested position.

REAR SUSPENSION, REYCO 79 KB, SINGLE - 31,000#

The rear suspension shall be rated at 31,000 lb. This is a steel spring suspension designed to reduce suspension maintenance. Slipper type springs eliminate spring eyes and shackles. The suspension shall include multi-leaf and parabolic taper leaf springs, cast spring hanger brackets and adjustable torque arms.

FRONT TIRES

The two (2) front tires shall be Michelin 385/65R22.5, XFE, load range "L", regional tread (medium to heavy loads, frequently on 2-lane roads) with a maximum rating of 10,000 pounds at a top speed of 75 mph.

REAR TIRES

The four (4) rear tires shall be Michelin 315/80R22.5, XZY3, load range "L", on/off road tread (heavy loads and slower speeds, operating on a mixture of improved secondary and aggressive road surface) with a maximum rating of 8,270 pounds at a top speed of 65 mph.

A set of roller chains for the rear tires shall be supplied.

WHEELS

Wheels shall be Alcoa aluminum disc type and hub piloted. The wheels shall be coated with Durabrite. Chrome plated nut covers shall be furnished.

FRONT AXLE "BABY MOON" HUB CAPS

Stainless steel "Baby Moon" type hub caps shall be provided on the front axle.

REAR AXLE "HIGH HAT" HUB CAPS

Stainless steel "High Hat" type hub caps shall be provided on the rear axle.

TIRE PRESSURE INDICATORS

Accu-Pressure Heavy Duty Safety Caps shall be provided and installed: each wheel shall be equipped with a valve stem inflation pressure sensitive monitor that shall provide a visual color indication of when the tire pressure is below the manufacturers recommended level. The chrome safety cap shall show green when the tire is properly inflated and red once the tire becomes underinflated.

TIRE BALANCE

EQUAL Tire Performance Balancing Compound shall be inserted into the front tires to balance and maintain a vibration-free rotation.

ENGINE

The chassis shall be powered by a 2013 emissions compliant Cummins ISX12 diesel engine, as described below:

Model	ISX12
Number of Cylinders	Six
Bore and Stroke	5.11 x 5.91 in
Displacement Liter (Cu. In.)	11.9 (729)
Rated BHP	500 @ 1800 RPM
Torque	1645 ft.lb. @ 1200 RPM
Governed RPM	2100
Oil Capacity / Type	12 gallons / SAE CJ-4
Fuel Requirement	Ultra low sulfur diesel (15 ppm max.)

Standard equipment on the engine shall include the following:

Selective Catalytic Reduction (SCR) after treatment
Cooled Exhaust Gas Recirculation system
Fan – 32", 11 blade
Charge air cooling
High pressure, common rail fuel system
Fuel filter with check valve and water separator
Fuel strainer
Governor – electronic, interact system
Injectors – electronically controlled full authority injection
Lube oil cooler – integral
Lube oil filter – full flow
Turbocharger – variable geometry type
Air compressor – Wabco 18.7 CFM

The engine exhaust system shall be a horizontal design constructed from heavy-duty truck components. Flexible couplings shall be utilized to absorb the torque and vibration of the engine. The outlet shall be directed to the forward side of the rear wheels, exiting the right side, with a straight tip.

A heat-absorbing sleeve shall be used on the exhaust pipe in the engine compartment area to reduce stored heat, providing protection for the alternator, and also to protect hands when checking or adding oil in the engine compartment.

ENGINE AND CHARGED AIR COOLING SYSTEMS

A serpentine core type radiator with continuous louvered copper fin design shall be provided. Radiator shall be fitted with formed steel side frames. The top tank shall have a built-in de-aeration system. A drain shall be located at the lowest point.

The engine charged air heat exchanger shall be located directly in front of the radiator and be bolted to its side rails. It shall be all aluminum-brazed construction. Air cooler shall be cross flow design with cast aluminum side tanks, horizontal inlet and outlet at top and aluminum louvered serpentine external air fins. Plastic tanks shall not be acceptable, no exceptions. Cooler tubers shall also be constructed of aluminum and have internal fins that eliminate laminar airflow.

The charge air cooler and the radiator shall be produced by the same manufacturer as a single assembly to provided continuity throughout

the cooling system. This shall ensure a certified "balanced" package for the chassis engine air and fluid cooling systems.

The radiator and charger cooler shall be mounted to the chassis stub. Fabricated mounting bracket for the fans ring shall be attached to the front of the engine in a manner so that it "floats" with the engine and increases the fan's efficiency by tightening the tip clearance. This mounting design eliminates engine fan and radiator shroud contact due to engine torque movement and promotes more efficient airflow. The radiator and charger cooler shall be held in place at the bottom by two (2) large bolts equipped with anti-stress rubber biscuits. The top of the radiator shall be supported by two (2). ¾" tubular braces, bolted to the chassis stub. Anti-vibration rubber biscuits shall be installed at the top threaded end of the braces where they attach to the radiator.

ENGINE COOLING CERTIFICATION

"EPQ" (End Product Questionnaire) certification shall be provided by the apparatus manufacturer and shall be done on a completed unit (after pump and complete body installation). Incomplete certifications (chassis only) shall not be acceptable.

FAN CLUTCH

A thermostatically controlled, clutch shall be provided for the engine cooling fan. The clutch shall be of a failsafe design, in that it shall fail in the "on" mode and thus prevent overheating in the event of component or air line failure. Manufacturer shall also wire the clutch so that it remains "on" in the pumping mode to prevent water pressure fluctuations.

COOLANT OVERFLOW RESERVOIR

A six (6) quart coolant overflow reservoir shall be provided. It shall be located in the engine compartment.

SILICONE HOSES

All hoses in the cooling system shall be silicone type with stainless steel constant torque Oetiker clamps.

TRANSMISSION

An Allison, Model 4000 - EVS, electronically controlled, 5 speed automatic transmission with integral fluid filter shall be provided. A

transmission cooler shall be installed in the radiator bottom tank. A warning light and buzzer shall be provided on the cab dash to alert the driver should the transmission overheat.

The transmission shall include the following: an oil life monitor, a filter life monitor, and a transmission health monitor. The oil life monitor determines fluid life remaining by monitoring various operating parameters. The filter life monitor determines when fluid filter(s) need to be replaced. The transmission health monitor determines when clutch system inspection is required. The monitors send a message via a blink code to a special prognostic light on the shift pad. Also on the shift pad shall be installed a digital, double-digit display that identifies the level of transmission oil.
The display shall identify the oil level as "Ok", "Lo" or "Hi", also indicating the number of quarts lo or hi.

The transmission shall include the following emergency vehicle specifications:

Maximum gross input power:	600 hp
Maximum gross input torque:	1850 ft.lb.
Input speed range:	1700 to 2300 rpm
Direct gear lock-up:	4th @ 1.00 to 1.00
Overdrive gear and ratio:	5th @ 0.74 to 1.00

Gear ratios shall be as follows:

1st	3.51 to 1
2nd	1.91 to 1
3rd	1.43 to 1
4th	1.00 to 1
5th	0.74 to 1
Rev	-4.80 to 1

The transmission shall automatically shift into neutral whenever the chassis parking brake is applied.

TRANSMISSION FLUID

The Allison 4000-EVS transmission shall be delivered from the factory with a synthetic SAE standard ATF.

TRANSMISSION PROGRAMMING

The transmission shall be programmed as a 5-speed with 5th gear

(overdrive) selected by mode button only.

TOUCH PAD TRANSMISSION SHIFT CONTROL

Touch pad control shift module shall be mounted to the right of the driver on the console and be indirect lighted for after dark operation.

DRIVELINE

Drivelines shall be built with heavy-duty metal tubes and utilize Spicer 1810 series or "Equal" mechanics type universal joints with "half round" end yokes. This quick disconnect strap and bolt design type end joint shall allow the driveline to be easily disassembled and dropped straight down for ease of service and maintenance. They also shall be dynamically balanced by the truck manufacturer before installation in the chassis. A splined slip joint is to be provided in each shaft assembly.

FUEL SYSTEM

The vehicle shall be furnished with a 75 gallon fuel tank mounted behind the rear axle and just below the frame rails using a stainless steel strap. The tank shall be constructed of hot rolled, pickled in oil steel and equipped with a swash partition and vent. The fuel tank shall meet all FHWA requirements including a fill capacity of 95% of tank volume and all DOT and FMVSS regulations for rollover protection. A 2" diameter fill inlet shall be provided. Fuel cap shall be of brass or bronze construction, non-vented and have lead safety fuses. It shall be chained to inlet tube or to the body sheet metal to prevent loss. Braided hoses shall be provided for the fuel lines. A 1/2" NPT drain plug shall be located at the bottom of the tank. The tank shall be installed using stainless steel straps and hardware, separated from the tank by a rubber insulating strip to prevent against chaffing. On trucks without torque boxes, the fuel tank pickup tube and sending unit shall be accessible without having to remove the tank.

The fuel fill inlet shall be located on the left (drivers) side of the apparatus. It shall be concealed behind a door marked "ULTRA LOW SULFUR DIESEL FUEL ONLY". The fuel inlet area, recessed behind the door, shall be completely enclosed to prevent dirt and debris from entering. Provision shall be provided inside the fill recess for drainage of any spilled fuel within the cavity.

The fuel door shall be constructed of stainless steel and shall have a brushed finish. It shall be vertically hinged along the side of the door. A magnet shall hold the door in the closed position. The door shall be kinked along 3 edges with the fourth side being used as s finger grab for opening and closing it. A stainless steel trim ring shall encircle the opening to prevent the fuel nozzle from damaging the surrounding surface when it is opened. The fuel shelf shall be made from a high impact polyethylene material.

ENGINE FUEL COOLER

An engine fuel cooler shall be provided on the apparatus. The engine fuel cooler shall cool the returning fuel from the engine using the water from the water pump.

FUEL WATER SEPARATOR WITH ALARM & HEATER

A Racor 490 spin-on 10 micron filter with fuel water separator with water sensor alarm and heater shall be provided.

ENGINE STARTER

A Denso, 12 volt, 5.0 kW gear reduction starter shall be installed.

ALTERNATOR

A 420 amp Delco alternator, model 55SI, shall be provided.

AIR COMPRESSOR

A Wabco 18.7 cfm air compressor shall be furnished. The air compressor shall be gear driven off the engine.

AIR CLEANER

A Donaldson Power Core dry type engine air cleaner shall be provided. It shall be installed in a location so that the filter element can be easily serviced.

AIR RESTRICTION INDICATOR IN INFORMATION DISPLAY CENTER

An electrical engine air restriction indicator shall be provided and installed in the cab information display center.

EXHAUST

A SCR chamber shall be installed in series with the DPF chamber on the right side of the vehicle, immediately behind the cab, and shall ingest urea from a remote storage tank providing a catalytic reaction with diesel exhaust particulates. The exhaust assembly shall be mounted outboard of the frame rail.

DPF REGENERATION PROCESS

NFPA 12.2.6.7.1 The regeneration process shall be activated by two methods:

1) Automatically by the engine system but only when the transmission is in gear and the speedometer indicates a speed above 5 mph (8km/hr) whether the apparatus is in motion or is operating in stationary pump mode with an engine rpm sufficient to register 5 mph (8 km/hr) on the speedometer.

2) Manually when initiated by activation of a switch located in the driver's area of the driving compartment.

Standard practice is to inhibit any automatic regeneration when in pumping or aerial mode. There shall also be an inhibit switch placed near the driver to inhibit an automatic reburn when driving.

DEF & DEF ACCESS

The urea mixture, a solution of 2/3 water and 1/3 urea which reacts with NOx to create nitrogen and water, shall be stored in a minimum 5 gallon tank equipped with a level sensor and alarm to prevent run-out. The urea tank shall be accessed by tilting the cab.

One (1) tank full of urea solution shall be required for every 500 gallons of diesel fluid.

TAILPIPE EXTENSION

The tailpipe shall be provided to accommodate a Plymovent exhaust evacuation system. The tailpipe shall be mounted perpendicular to the side of the truck and be flush with the body. 12" of clearance between the pipe and the tire will be provided. The tailpipe mounting shall be straight out from the body.

It is understood that the 2013 engine exhausts can not be connected to exhaust evacuation systems when the Diesel Oxidation Catalyst and Diesel Particulate Filter on the engine are regenerating.

EXHAUST HEAT SHIELDS

Heat shields shall be provided as needed to prevent damage to body and wiring from excessive exhaust temperatures. The exhaust pipe shall be wrapped in multi-layered insulation blankets, from just aft of the turbo down to inlet side of the DPF. Each blanket shall have a fiberglass inner layer and a silicone impregnated fiberglass cloth outer layer

The cab shall receive 1.25" thick foil back insulation blanket under the crew floor to reduce floor temperatures.

All harnesses and cables, in proximity to exhaust system components, shall be protected with insulation.

ENGINE BRAKE

A Jacobs engine brake shall be installed with controls within easy reach of the driver. Brake shall automatically be actuated when the accelerator pedal is released. The engine brake shall be wired in conjunction with the rear brake lights so that they are activated when the engine brake is engaged. It shall have a three position switch; "LOW", "MEDIUM" and "HIGH" along with an "OFF" and "ON" switch.

FAST IDLE SWITCH

A fast idle switch shall activate an engine high idle. The circuit shall be wired through the neutral safety/parking brake interlock to prevent activation when the transmission is in the road mode. Fast idle shall be set at 1000 RPM's. A switch located inside the cab convenient to the driver shall be provided for this system.

LUBRICATION DECAL

A decal shall be installed on the interior face of the driver's door, near the hinge and below the window controls. The decal shall specify the quantity and type of lubrication fluids used in the following chassis or apparatus components: engine, chassis transmission, pump transmission, pump primer and rear axle differential. Engine coolant type and quantity shall also be stated.

STAINLESS STEEL FULL TILT CAB

The cab shall be designed specifically for the fire service and shall

provide roll cage strength and safety. The stainless steel cab shall be made in the factory of the bidder and must utilize the bidder's top-of-the-line technology and manufacturing techniques. The entire cab shall tilt forward 45 degrees for engine access. No plastic, fiberglass, or aluminum shall be used in the construction of the cab sub-frame, floor assembly, front assembly, side assemblies, back wall assemblies or roof assembly.

CAB DIMENSIONS

The back wall of the 141" cab shall measure 72" from the center of the front axle. The cab shall have an inside width of 91" and outside width of 96". Entrance step wells to the driver's and officer's positions shall be a minimum of 26" wide and the rear crew step wells shall be 26" wide. They shall be "spaced" at front, rear and side to prevent trapping of dirt and other residue. Entrance steps shall be made of expanded aluminum grating.

CAB MOUNTING

A four point isolated mounting system shall be provided. The cab mounting system shall consist of two (2) front pivot mounts fabricated of steel and two (2) rear cab mounts that are isolated from the chassis frame by center bonded rubber isolators. Each front pivot mount shall consist of a greaseless pin and a multi-layered, self-lubricating, composite bearing. The outer layer of the bearing shall be high-durometer rubber to isolate road vibrations and shock.

SUB-FRAME

The sub-frame shall be stainless steel plate and tube welded to 3" x 4" rectangular structural steel tubes, with the 4" stainless steel tubing used in a vertical orientation. All joints shall have continuous welds; stitch welding shall not acceptable. The sub-frame shall be designed as a continuous structure from the front to the back of the cab. It shall be used to support the cab while tilting, join front pivots to the cab locks, and to join the cab to the chassis. Pocketing of the sub-frame shall not be acceptable. Use of the engine tunnel as part of the main sub-frame shall not be acceptable.

CAB FLOORS

All floor components shall be welded directly to the sub-frame. The floor shall be constructed of 50,000 psi stainless steel. Cab floors shall be covered with a sound barrier mat with a heavy-duty wear surface.

FRONT ASSEMBLY

The safety-cage section at the front of the cab shall be constructed of 1.25" stainless steel tubing and shall join the front door posts together with the main sub-frame. There shall be a 2.50" x 1.50" x .25" heavy wall lower cross tube that joins the cab sills together to prevent cab twisting when tilting the cab. The front fire walls shall be set back from the front assembly structure to provide added protection in a frontal crash. The outer cab skin shall not be an integral structural member, although it shall help stiffen the cab front face.

SIDE WALL ASSEMBLIES AND DOORS

The safety-cage on the sides shall be constructed of 1.25" stainless steel tubing. Both side wall assemblies shall be joined to the sub-frame via thick tubular structures, using heavy fillet welds. This shall strengthen the walls to withstand high roof loading. The side wall outer skins shall be integral with the cab structure as well as additional formed components to help stiffen side wall assemblies. There shall be 1.25" of insulating foam between the exterior and interior side walls. The structure shall be reinforced for cab entry grab handle mountings. The front door hinge mount (aka "A" pillar) shall be a 2" x 3" tube with a .19" thick wall. The rear door hinge mount (aka "C" pillar) shall be equivalent to a 12 gauge formed channel with .19" thick tapping bar.

BACK WALL ASSEMBLY

The safety-cage on the back wall shall be constructed of 1.25" stainless steel tubing. It shall join the roof to the floor assembly. Construction of the back wall assembly shall utilize a minimum of 12 gauge stainless steel material and the design shall provide crush protection in the event of a rollover. The back wall structure shall be uniform, regardless of the seating choices. All seat mounts and seatbelt mounts shall use weldnuts to eliminate pullouts and stripped threads. The outer skin shall not be an integral structural member, although it shall stiffen the back wall. One inch of insulating foam shall be located between the exterior and interior back walls.

ROOF ASSEMBLY

The perimeter structure of the safety cage roof assembly shall be tied by repeating 1.25" stainless steel tubing to maximize loading potential across the whole roof. The fabricated and welded roof sills and front

header shall be made of 50,000 psi stainless steel material. The corner caps shall utilize spun metal technology thus retaining the metal's strength while producing a very rigid corner joint. The side roof covering (rolled edges) shall be constructed of stainless steel formed in a quarter round. It shall form a hollow double wall, angle reinforced roof edge with an integral drip rail. There shall be 1.25" of insulating foam between the exterior roof and interior ceiling.

ATP OVERLAY ON BACK OF CAB

An aluminum treadplate overlay shall be provided on the exterior rear wall of the cab. Strips of aluminum treadplate shall cover the full height of the rear wall of the cab, and shall run from the outside edge of each side of the cab in towards the center approximately one-quarter of the width of the cab. If an optional window is provided on the rear wall of the cab, it shall be fully surrounded by the aluminum treadplate.

CAB GRILLE - VERTICAL BARS AND RAISED BEZEL SURROUND

The cab front opening shall be covered with a custom made polished stainless steel grille that shall be fabricated in the bidder's factory. The grille shall have formed vertical bars spaced apart on 2" centers. The upper polished stainless steel grille shall have a matching lower counterpart to further facilitate engine cooling. The two (2) stainless grilles shall be housed in a custom, raised and chrome plated bezel.

ENGINE AIR INTAKE GRILLE WITH WATER/EMBER SEPARATOR

The air intake shall be concealed behind the cab grille. The water and ember separator shall set behind the cab grille on the officer's side. This may be cleaned or replaced by tilting the cab.

FLAT ROOF

A flat roof shall be provided with an interior floor to ceiling height of 57".

PAINTED CAB ROOF

The exterior surface of the cab roof shall be painted in compliance with the cab paint specifications detailed elsewhere in this specification document.

CAB DOOR CONSTRUCTION - BARRIER CLEARING

The cab doors shall be barrier clearing and fabricated from stainless steel (No exceptions). The cab doors shall be 34.75" wide. The interior and exterior door handles to be flush mounted paddle style with a keyed lock incorporated in the exterior handle and lever control lock incorporated in the interior handle. Six (6) inch wide strap style door checks shall be provided. The door check's straps shall have a tensile strength of 120 lbs/in of width. The door's latch locking mechanism shall make it impossible to lock oneself out of the cab unless locked with the supplied key. Doors shall be hung on stainless steel full length hinges attached to cab and door with .25" bolts. The hinges for each door shall be of one-piece 304-2B stainless steel construction with ¼ stainless steel pins and 0.090 gauge leaves with 2" joints and a 3" width opening. Doors shall meet Federal Motor Vehicle Safety Standard #206. The doors shall be designed so as to allow the windows to roll completely down. Each cab door inner panel shall have a minimum of 96 square inches of reflective material installed to alert traffic when doors are open.

CAB TILT

The cab shall tilt a minimum of 45 degrees for normal servicing of the engine and other equipment. The tilt cab locking system shall be a two-point type that locks automatically when the cab is lowered into its nested position. The cab tilt package is custom designed for safety and ease of vehicle maintenance. The hydraulic tilting system consists of two (2) heavy-duty single acting cylinders equipped with velocity fuses at the cylinder base in case of any failure in the operating mode. The power supply is a high efficiency electric over hydraulic system with an integral mechanical override in case of battery failure. All components and parts are designed for installation with a minimum of 3 to 1 safety factor based on current S.A.E. standards.

In addition to the velocity fuses, a secondary safety system shall be provided to hold cab in the fully raised position in the event of a failure in the primary lift mechanism. It shall consist of a metal channel device, which automatically drops over the extended rod of the left side hydraulic lift cylinder thereby preventing its retraction. The safety channel can only be released through an overt action made by the operator such as pulling a lever or cable. Automatic release of the safety system shall not be acceptable.

The cab tilt system shall be remotely controlled utilizing a twelve foot cable with a hand held push button device which is to plug into a

receptacle in the bumper area on the left-hand side of the cab. The receptacle shall have a spring-loaded weatherproof cover.

INTERMEDIATE CAB STEPS

Four (4) stationary steps shall be provided, one at each cab door. The steps shall be approximately 12.0" long, have a 9.0" radius, and be located to the front of each cab step well. The steps shall be constructed of aluminum grating.

CAB SIDE ACCESS DOOR

Two (2) stainless steel cab side access doors shall be provided on the cab, one each side between the front doors and front crew cab windows. Door openings shall be approximately 13.00" wide x 25.00" high. "D" handle type latches shall be provided on the lower rearward part of the door. The doors shall be vertically hinged with a chain type stop.

CAB SIDE ACCESS DOOR FRAME SCUFFPLATES

A highly polished stainless steel scuffplate shall be installed on the striker side of each cab side access door frame and shall run the full height of the door opening. The scuffplate shall be a single bend configuration that guards the outer door frame post from damage and chips to the paint.

FRONT GRILLE SCRIPT NAMEPLATE

An nameplate, fabricated from AISI 304 stainless steel, with mirror finish, shall be located on the lower front engine cooling intake grille fo the cab.

FRONT ALUMINUM INNERLINERS

Semi-circular innerliners shall be provided in each front wheel housing. They shall be constructed of aluminum and shall be bolted in place so they may be removed if damaged. Self-tapping sheet metal screws are not acceptable. The outside edge of the innerliner shall be bolted along its entire length. The bottom edge of liner shall not have a formed reinforcement flange to avoid trapping dirt and debris.

FRONT FENDERETTE

Polished stainless steel fenderettes shall be installed in the front

wheel openings. They shall be sufficiently wide to completely cover the outside rear tire and reduce wheel splash along the sides of the cab. They shall be installed with 1/4" hex head bolts (self-tapping sheet metal screws are not acceptable) and have a full width rubber welt placed between the fenderette and body wheel well opening flange.

Outside edge of welting shall form a "V" bead between fender and cab side face to prevent moisture from entering. Inside edge shall also have a small raised bead. Outside edge of fenderette, at the wheel opening shall be rolled inward to eliminate a sharp edge and avoid injury when cleaning apparatus.

FRONT AND REAR MUD FLAPS

Heavy duty mud flaps with manufacturer's "script and flame logo" shall be provided at the rear of each front wheel and at the rear of the rear dual wheels. Front flaps shall be 15" wide and rear flaps shall be 24" wide. Mud flaps shall be made of 0.38" heavy duty rubber material to prevent "sailing".

MIRRORS

Two (2) Rosco Accustyle heated mirrors with remote shall be installed on the cab doors, one on each side of the cab. The flat upper mirror shall measure 7" x 14" and the lower convex section shall measure 6.5" x 6". The mirrors shall have a black or chrome finish.

WINDSHIELD

The windshield shall be of tinted automotive laminated safety plate glass with a curved two-piece design. The windshield shall have approximately 2900 square inches of visual area. Right and left hand windshield glass shall be symmetrical and interchangeable from side to side to minimize spare parts stock and expense. Windshield shall be installed and held in place by an extruded rubber molding with a bright finish, decorative, locking bead. Cab shall be finish painted prior to windshield glass being installed.

WINDSHIELD WIPERS AND WASHERS

One (1) wet arm operated windshield wiper shall be provided for each plate of windshield glass for accessibility and optimum windshield wiping surface areas. Wipers shall be two speed type with

intermittent wiping feature. One (1) control switch shall be provided and located on the self-canceling directional switch for both wiper arms. The switch shall combine the on/off (automatic park position), two speed, intermittent and washer functions in one control. The turning switch shall activate the wipers and control speed, and pushing it shall operate the washers.

WINDSHIELD WASHER RESERVOIR

A four (4) quart windshield washer fluid reservoir shall be provided. It shall be accessed in the driver's step well with a remote fill. A visual inspection shall be possible without tilting the cab (NO EXCEPTIONS).

DOOR WINDOWS

A retractable window with automotive type tempered safety glass shall be provided in all four (4) cab doors. All glass shall be tinted. Glass shall slide in stainless steel side channels with cloth/fiber liners. Rubberized fiber seals shall be located at the bottom of the window opening to prevent water and debris from entering the interior of the door when the glass is up (or down). A seal shall be placed on both sides (interior and exterior) of the glass

The front door glass shall be 23.75" high x 25.75" wide upper and 27.50" wide lower. The rear door glass shall be 23.75" high x 30" wide. The door window openings shall be trimmed on the exterior side with a smooth, black, poly vinyl chloride (PVC) molding

Electric power window regulator shall be manufactured by the Muncy Corporation and shall be the enclosed, sliding flexible shaft, gear type for ease of operation and reliability. The shaft shall enter a vinyl plastic protective sheath whenever it is exposed. A 12 volt electric motor with gear reduction box to slow driven gear rpm and increase power transmission shall be provided. Individual switches shall be provided so that the driver controls the left side forward door window, officer the right side and crew occupants the rear.

DRIVER'S DOOR GLASS SWITCH

An individual switch for the driver's electric door window shall be provided on the driver's dash. **Aftermarket add-on type electric power window conversion devices like the type that replaces the crank arm will not be acceptable.**

OFFICER'S DOOR GLASS SWITCH

An individual switch for the officer's electric door window shall be provided on the officer's dash.

Aftermarket add-on type electric power window conversion devices like the type that replaces the crank arm will not be acceptable.

CREW DOOR GLASS SWITCHES

An individual switch for the crew electric door windows shall be provided on the crew doors.

Aftermarket add-on type electric power window conversion devices like the type that replaces the crank arm will not be acceptable.

CREW CAB SIDE GLASS

There shall be a side window on each side of the cab between the doors. They shall be tinted and be manufactured of automotive tempered safety glass. Each window shall be 23" high x 17" wide to provide maximum vision. They shall be installed and held in place by an extruded rubber molding with a chrome plated, decorative, locking bead. Cab shall be finish painted prior to window glass being installed.

CAB TRIM

Decorative molding is to be provided across the front and along both sides of the cab just below the windshield level. The molding shall be the automotive adhesive type made of poly vinyl chloride (PVC). It shall be 5/8" wide with chrome plated outer edges and a 5/16" textured black center strip.

CAB DOOR HINGES

All piano hinges on the exterior cab doors shall have a polished finished.

CAB HANDRAILS AND GRAB HANDLES

Handrails shall be 1-1/4" diameter extruded aluminum, knurled, with a bright anodized finish.

All handrail stanchions shall be chrome plated. They shall be bolted

to the body with 1/4" stainless steel hex head bolts. Stanchions shall have a rubberized gasket placed between them and the body surface they are mounted on. A drain hole shall be provided in each bottom stanchion.

Handrails and handles shall be installed as follows:

Four (4) 24" handrails shall be installed on the side of the cab, one just to the rear of each cab door.

Four (4) 6" chrome grab handles shall be provided, one on the inside of each cab door:

Two (2) 12" rubber covered grab handles shall be provided, one on the driver's side and officer's side front A-pillar, above the door hinge, to assist in entry to the cab.

Two (2) 12" rubber covered grab handles shall be provided, one on each rear crew door hinged-pillar, on the hinged side of the door, to assist in entry to the cab.

CRASH TEST

The cab shall be certified for the following tests:

SAE J2420: Cab Over Engine (COE) Front Strength Evaluation - Dynamic Loading - Heavy Trucks
SAE J2422: Cab Roof Strength Evaluation - Quasi Static Loading - Heavy Trucks
ECE Regulation 29: Protection of Occupants of Cab in Commercial Vehicle

Performance Measure:

1. After undergoing each test, the cab of the vehicle shall exhibit a survival space accommodating a 50th percentile male ATD in the median position without contact between the manikin and non-resilient parts for all seating positions.
2. None of the doors shall open during the tests.
3. The cab attachments may be distorted or fractured, however, the cab shall remain attached to the vehicle frame in at least one attachment location.

A copy of the proposed cab certification in these areas shall be supplied by the chassis manufacturer.

SEAT ALARM SYSTEM

A seat alarm system provided by LifeGuard Technologies shall be installed in the cab, as mandated by NFPA 1901 14.1.3.10. The alarm system shall be activated anytime the parking brake is released or the automatic transmission is not in park. The system shall consist of an audible alarm that can be heard at all positions designated to be occupied while the vehicle is in motion and a visual display to the driver or officer showing the condition at each seating position.

The visual display shall give the following indications:

Affirmative Indication:	Senses occupant and belt is buckled.
Negative Indication: unbuckled.	Senses occupant and belt is
Negative Indication: buckled.	Senses no occupant and belt is
Dark: unbuckled.	Senses no occupant and belt is

HELMET HOLDER - BODY

The helmets shall be stored in the body in accordance with NFPA 1901 current regulations:

CAUTION LABELS

Caution labels shall be posted in the cab so that they shall be visible from each seat position. The labels shall read: "Do Not Wear Helmets While Seated".

HEADLINER

The cab shall be provided with a removable headliner for ease of servicing the electrical wiring placed in the cab roof. The headliner shall consist of 3 layers of material. Next to the roof shall be a layer of acoustical insulation made of polyester and polypropylene fibers. The next layer is 1/4" thick Luann. Finally, there is a 1/4" thick layer of foam/perforated acoustical vinyl. The headliner shall be the multi-piece type (minimum of three (3) sections) so that the entire liner does not have to be removed for localized maintenance.

BACK LINER

The cab shall be provided with an aluminum treadplate removable back liner. The back liner shall be the multi-piece type (minimum of

three (3) sections) so that the entire liner does not have to be removed for localized maintenance.

Rear Wall Toolboard

Pac Trac tool mounting shall be provided on the rear wall of the cab. The Pac Trac shall be vertically stacked outboard of fold down seats full height of the rear cab wall.

ENGINE ENCLOSURE

The engine enclosure structure shall have a 1-1/4" thick inner lining, on the engine side, comprised of aluminized foil and foam/barrier composite for heat insulation. The tunnel cover shall have 1/2" decoupled foam lower and 1" decoupled foam upper covering, on the cab interior side, for noise insulation. The top forward portion of the hood shall have a full-width riser with a sloped face for the installation of the switch panel. The sloped panels shall be used for vehicle accessory controls. A minimum of 1" shall be provided between the right edge of the accelerator pedal and the side of the engine hood. A removable cover over the engine enclosure and insulation shall be coated with Line-X to act as an insulator for sound and engine temperature, as well as to provide an easy-to-clean work surface.

In order to optimize in-cab vision and seating space for the driver, officer and crew members while properly seated and belted in turn-out gear, the maximum overall dimensions of the engine enclosure shall not exceed:
- 26.25" from floor to top of engine tunnel between driver and officer
- 26.25" from floor to top of engine tunnel at front center dash panel
- 31.25” from floor to top of driver and officer dash panels

ACCESSORY MOUNTING STRUCTURE

The top portion of the engine enclosure shall have an 1/8" thick aluminum channel frame located between the engine tunnel structure and the cover to support the cover and facilitate mounting of accessories and equipment.

ENGINE COMPARTMENT ACCESS DOOR

An access door shall be provided at the rear of the engine enclosure for routine engine fluid checks. The access door shall be insulated

from engine heat with aluminized foil/foam/barrier composite and sealed to prevent exhaust fumes from entering the crew cab.

18" STEERING WHEEL WITH TILT/TELESCOPE

A padded 18" steering wheel with center horn ring shall be provided. The upper steering column shall be of the tilt and telescopic type. A self-canceling directional switch with wiper control and headlight dimmer control shall be mounted on the steering column with an ICC four way flash switch. The self-canceling directional switch shall be easily removable and replaceable without removing the steering wheel or column assembly. The junction of the shaft and the cab floor shall be sealed to prevent air exchange between the cab interior and exterior.

LINE-X FOR CAB DASH

The cab dash shall be sprayed with Line-X having a high resistance to abrasion and tearing. A vinyl cloth glued or laminated in some manner to a metal backing surface shall not be acceptable.

The Line-X shall absorb impact without surface damage. The Line-X shall be resistant to gasoline, diesel fuel, paints, bleaches, organic solvents and other cleaning agents and chemicals. It shall include sound dampening and vibration elimination properties.

The Line-X shall be solvent free and be environmentally safe to apply with no VOC or CFC hazards. Its surface shall have a non-glare, granular texture and be easily cleaned with common cleansing compounds.

OFFICER'S DASH

The standard (no notch) configuration of the officer's dash shall be provided.

SUN VISORS

Two (2) 6.625" x 29.50" padded sun visors shall be provided, one on the driver's side and one on the officer's side. Visor shall be supported at both ends to prevent drooping.

VEHICLE DIMENSION SIGN

A sign shall be provided in the front cab area indicating the height of the completed apparatus in feet and inches, length of the completed

apparatus in feet and inches, and the gross vehicle weight rating (GVWR) in tons.

CABLE RACEWAY

A cable raceway, 1.75" x 5.75", shall be installed underneath the officer's floor. It shall run between the officer's kick plate and the seat riser.

INNER DOOR PANELS – LINE-X (4)

The upper inside bolt-on panel on each cab door shall be removable and shall be constructed of aluminum covered with Line-X.

All cab passenger compartment doors shall have at least 96 square inches of reflective material affixed to the inside of each door to alert traffic when the door is open. The reflective material shall be a chevron design that complies with NFPA requirements.

DRIVER'S SEAT

The driver's seat shall be an H.O. Bostrom Sierra Air-100 reclining high back seat with air suspension. A DOT approved 3-pt. shoulder harness shall be furnished that is red in color. The seatbelts shall meet NFPA 1901 length requirements.

An NFPA compliant Zico model ULLH universal SCBA bracket with straps shall be installed in the driver's side compartment behind the driver's seat and accessible from the cab side access door.

OFFICER'S SEAT

An H.O. Bostrom Tanker 450 SCBA seat shall be provided for the officer. This seat shall have 5" horizontal adjustment. A DOT approved 3-pt. shoulder harness shall be furnished that is red in color. The seatbelts shall meet NFPA 1901 length requirements.

The driver's seat shall be held at NFPA regulated height by a C Channel Bracket.

The officer's seat shall be held at NFPA regulated height by a 3CR12 stainless steel frame which creates an enclosed compartment. The compartment measures approximately 15.5" wide x 10.5" high x 17" deep, front to back at the top and 8.5" deep front to back at the bottom. The compartment shall have a front opening door,

measuring approximately 13.5" wide x 8" high.

Five (5) NFPA compliant Zico model ULLH universal SCBA bracket with straps shall be installed in the crew seat(s).

RADIO

One (1) Panasonic AM/FM/CD/Weather Band radio with four (4) 5.25" speakers shall be provided and installed. The stereo radio shall be centrally located in the overhead console and the speakers shall be located two (2) in the front of the cab behind driver and officer, and two (2) in the rear cab corners. A stereo antenna shall also be installed.

RADIO ANTENNA MOUNT

There shall be three (2) standard 1.125", 18 thread antenna-mounting base(s) installed on the cab roof, aft of the lightbar, evenly spaced across the roof for high efficiency, low loss, shielded coaxial cable(s) routed to the radio mounting area. A weatherproof cap shall be installed on the mount.

Radio Mounting Location

There shall be a mounting spot for (2) DIN size radios in the dash easily reachable by the driver and passenger. They shall have a minimum clearance depth of 10" for each. The radio antenna cables should terminate in this location. Also there shall be (2) 50 amp 10 gauge red power wire hard wired to constant clean 12v power source. There shall also be (2) 5 amp 14 gauge power wires connected to the ignition power in this location. And then (2) 10 gauge black chassis ground wires at this location.

REAR SEATING

The rear crew cab section shall contain two (2) outboard rear facing H. O. Bostrom Tanker 450 SCBA passenger seats. The seats shall be installed one (1) each side at the rear of the engine enclosure. The seating area shall allow maximum room for fire fighters in full turn out gear.

DOT approved 3-pt. shoulder harnesses shall be furnished that are red in color. The seatbelts shall meet NFPA 1901 length requirements.

REAR SEATING

The rear crew cab section shall contain two (2) center forward facing H.O. Bostrom 400CT SCBA flip-up passenger seats. The seats shall be installed on the rear wall of the cab directly behind the engine enclosure. The seating area shall allow maximum room for fire fighters in full turn out gear. DOT approved 3-pt. shoulder harnesses shall be furnished that are red in color. The seatbelts shall meet NFPA 1901 length requirements.

SEAT BELTS

The seats shall have a standard seat belt attached that meets FMVSS and NFPA 1901 current edition requirements.

Inboard rear facing seats shall have a 2 point lap belt style seat belt. All other seats shall receive a 3 point fixed D Loop style seat belt.

SEAT UPHOLSTERY

All cab seats shall be upholstered in black colored vinyl material.

INTERIOR DÉCOR

The following components shall be black in color:
Headliner
Head bumper over crew doors
Backliner, if using padded acoustical material
Vinyl visors, if selecting vinyl

The following components shall always be black in color:
Floor matting and floor mat edging
Headliner trim
Backliner trim
Crew heater, complete assembly
Electrical panels
Officer's dash access panel
Plastic snap plugs for wire access holes
Door seals
Seat risers
Underseat compartments
Seat belt retractor cover.
Rubber covered grab handles
Map Desk, if present

INTERIOR LINE-X DECOR

The following items, with Line-X finish, shall be black in color:
Engine cover and center dash, including engine access door and electrical access door
Driver and officer dashes
Overhead dash
Upper interior door panels (void if selecting brushed S/S)
Lower door panels (void if selecting brushed S/S or ATP)
All interior compartment exteriors, if selecting (large storage compartment and side access compartments)

CAPACITY SIGN

A sign visible to the driver, that states the number of personnel the vehicle is designed to carry, shall be provided.

REAR SEAT COMPARTMENT

There shall be provided one (1) compartment constructed of aluminum and measuring approximately 41" W x 11" H x 16" D. It shall be installed under two rear inboard forward facing seats or under a single rear inboard forward facing seat. Access to this compartment shall be through two (2) drop-down doors. The interior and exterior walls of the compartment shall have a black spatter finish.

HEATER/DEFROSTER-FORWARD CAB

A front cab heater/defroster unit shall be provided. The unit shall have a heating capacity of 30,000 BTU and combined 520 CFM variable speed blower assembly. The unit shall be located on top of the engine tunnel and shall be centered on the windshield. Defroster outlets shall be located at the bottom of the windshield and shall direct air flow from the unit up on to the windshields. Vents shall be located in the drivers and officers dashes and kick plates.

CONDENSER COVER

The air conditioning condenser assembly shall have an additional cover and / or covers to protect the Freon hoses, dryer, vavles, switches and / or solenoids above the cab roof and connected to the condenser body.

The main condenser body shall have one fabricated cover with openings for, and above, the condenser fans. The main condenser body cover shall be approximately 7.5" high x 46.5" long x 26.25" wide and fabricated from 1/8" aluminum treadplate. Additional

covers, formed from 1/8" aluminum treadplate, shall be provided for hose and harness routing above the cab roof, as necessary.

MANUAL COOLANT SHUTOFF VALVE - INLET

The forward cab heater inlet flow shall be interrupted by one (1) manual engine coolant shutoff valve mounted behind the engine for auxiliary engine coolant flow control. The valve shall be 1/4 turn style with label for ease of identification.

REAR CREW CAB HEATERS

Two (2) rear crew cab heaters with a combined rating of 64,000 BTU output and 850 CFM air flow shall be provided. The rear cab heaters shall be mounted under the rear facing outboard seats each side. The units shall have a variable speed blower, and a removable, replaceable filter.

MANUAL SHUTOFF VALVE FOR CREW CAB HVAC COOLANT INLET

The crew cab heater inlet flow shall be interrupted by one (1) manual engine coolant shutoff valve mounted behind the engine for auxiliary engine coolant flow control. The valve shall be 1/4 turn style with label for ease of identification.

AIR CONDITIONING SYSTEM

The cab shall be equipped with an air conditioning system that shall include two (2) ceiling mounted evaporators. The air conditioning system shall have a combined cooling capacity of 79,000 BTU and variable speed blower assemblies for a combined 1100 CFM. The main controls for the unit shall be located in the dash. The evaporators shall have air diffusers to allow for multi-directional airflow. Each diffuser shall be adjustable up and down and side-to-side for individual preference. Each evaporator shall have it's own sump style drain system for removal of condensation. The sump shall be integrated into the ABS evaporator cover.

The evaporators shall be compliant with all EPA regulations and use R-134A Refrigerant. All hoses used in the air conditioning system shall be “barrier” type construction for containment of the refrigerant.

The condenser assembly shall be a stacked type, low profile, dual fan compact design with dryer and pressure switch included. The

condenser assembly shall include a white powder coated cover over the stacked condenser coils. The condenser shall be located on the cab roof.

The air conditioning system shall exceed the industry norm by cooling the cab from the ambient temperature of 100 degrees Fahrenheit at 50% relative humidity to an average cab temperature of 75 degrees Fahrenheit in 30 minutes.

HVAC CONTROLS - FORWARD CAB

HVAC controls shall feature rotary switches, function labeling, backlighting, and have colored indicators and shall be located in the center dash area between the driver and officer.

POWER STUDS (OVERHEAD SWITCH PANEL)

Four (4) studs shall be provided in the overhead switch panel to provide a 12 volt feed. The studs shall consist of a 12 volt direct stud, switched battery stud, switched ignition stud and grounding stud.

POWER STUDS (CAB DASH)

Four (4) studs shall be provided in the cab dash area to provide a 12 volt feed. The studs shall consist of a 12 volt direct stud, switched battery stud, switched ignition stud and grounding stud.

BUSS BAR (UNDER OFFICER'S SEAT)

A four (4) stud buss bar shall be provided under the officer's seat to provide a 12 volt feed. The studs shall consist of a 12 volt direct stud, switched battery stud, switched ignition stud and grounding stud.

GENERAL 12-VOLT ELECTRICAL WIRING REQUIREMENTS
12-VOLT ELECTRICAL SYSTEM

The apparatus shall be equipped with a heavy-duty 12-volt electrical system. All 12-volt electrical equipment installed by the apparatus manufacturer shall conform to modern automotive practices. All electrical wiring and components installed in the apparatus shall be suitable for use in severe duty emergency vehicle applications.

GENERAL WIRING AND WIRE HARNESS CONSTRUCTION

Unless otherwise specified by the component supplier, all insulated wire and cable shall conform to SAE J1127 *Low Voltage Battery Cable* type SGX or STX, or SAE J1128 *Low Voltage Primary Cable* type SXL, GXL, or TXL.

Circuit feeder wires shall be stranded copper or copper alloy conductors of a gauge rated to carry 125 percent of the maximum current for which the circuit is protected.

Conductor materials and stranding, other than copper, shall be permitted if all applicable requirements for physical, electrical, and environmental conditions are met as dictated by the end application.

The overall covering of conductors shall be moisture-resistant loom or braid that has a minimum continuous rating of 194°F (90°C) except where good engineering practice dictates special consideration for loom installations exposed to higher temperatures.

The overall covering of jacketed cables shall be moisture resistant and have a minimum continuous temperature rating of 194°F (90°C) except where good engineering practice dictates special consideration for cable installations exposed to higher temperatures.

CIRCUIT IDENTIFICATION

All wiring shall be uniquely identified by a circuit number and color coding. The identification shall be referenced on a wiring diagram. Wires less than 8 AWG shall be permanently identified at least every 2.0 inches (50.8 mm) by a circuit and function code. Cables equal to or larger than 8 AWG and wires included in jacketed cables shall be permanently identified by circuit number at all terminations.

WIRING CONNECTIONS

All wiring connections and terminations shall use a method that provides a positive mechanical and electrical connection. The wiring connections and terminations shall be installed in accordance with the device manufacturers instructions. Secondary locks shall be utilized on all connectors that are secondary lock capable.

Exterior exposed wire connectors shall be environmentally sealed to withstand elements such as temperature extremes, moisture and automotive fluids. Seal plugs shall be installed in all unused sealed connector cavities.

All ungrounded electrical terminals shall have covers or be in

enclosures to protect against corrosion, excessive heat, excessive vibration, physical damage, liquid contaminants, dust, and other environmental factors.

Wiring splices shall be crimp-type, molded, or sonic weld type. Adhesive lined heat shrink tubing shall be used to seal and insulate splice joints.

WIRE AND CABLE ROUTING

Wiring routed through holes in sheet metal or castings shall have edges protected by an appropriately sized grommet.

Wiring shall be routed to avoid metal edges, screws, trim fasteners and abrasive surfaces. When such routings are not possible, protective devices (shields, caps, etc.) shall be used to protect the wires. When wires must cross a metal edge the edge shall be covered with a protective shield.

Wiring shall be routed to provide at least 3 inches (76.2 mm) clearance to moving parts, unless positively fastened or protected by a conduit.

Wire routings should avoid areas where temperatures exceed 180° F (82.2° C) and a minimum clearance of 6 inches (152.4 mm) shall be maintained from exhaust system components. Where compliance with this requirement is not possible, high temperature insulation and heat shields shall be utilized.

When wiring is routed between two members where relative motion can occur the wiring shall be secured to each member, with enough wire slack to allow flexing without damage to the wires.

Wiring to all circuit components (switches, relays, etc.) in exposed locations shall provide a drip loop to prevent moisture from being conducted into the device via the wire connection.

Routing wires into areas exposed to wheel wash shall be avoided if possible. When such routings cannot be avoided, adequate clipping or protective shields shall protect the wires from stone and ice damage.

Wiring shall be secured in its intended location with appropriately sized bolt-on clips and nylon wire ties.

Electrical components designed to be removed for maintenance shall

include a sufficient length of wire to allow the component to be pulled away from the mounting area for inspection and service work.

Bulkhead type connectors or sealed fittings shall be used to prevent the entry of liquid contaminants into weather tight enclosures.

SPARE WIRES

Wiring harnesses from/to major power and signal distribution areas of the apparatus shall include spare wires for future expansion of the system.

ELECTRICAL SYSTEM COMPONENTS

Serviceable components shall be readily accessible. Switches, relays, terminals and connectors shall have a dc rating of 125% of the maximum current for which the circuit is protected.

A distributed power and signal system shall be utilized on the apparatus to minimize power supply voltage drops. Power and signal distribution areas in the cab shall be concentrated in five (5) areas.

A lower cab power and signal distribution center shall be located in the center forward portion of the cab "dash". It shall be hinged and opened by unlocking two (2) top mounted, double hinged, lift and pull latches. This area shall contain relays and circuit breakers installed in a logical and serviceable fashion.

An additional lower cab power and signal distribution center shall be located below the officer's dash behind the kickplate.

An upper power and signal distribution area shall be located in the forward portion of the cab ceiling, above the engine tunnel. Components in this area shall be permanently labeled and easily accessible by opening a hinged cover.

A power and signal distribution area shall be located in the pump module, if applicable. Components in this area shall be permanently labeled and easily accessible.

A power and signal distribution area shall be located on the front of the forward body compartments. Components in these areas shall be permanently labeled and easily accessible.

All electrical components or devices installed in an exposed area on the outside of the cab or body shall be mounted in such a manner, or

protected by a gasket, caulking or other means, so that moisture shall not accumulate in it.

CORROSION PROTECTION

Externally exposed, non-plug type, electrical connections shall be given a hand applied or sprayed application of an industrial standard insulation coating with a minimum rating of 2100 volts per mil thickness. Insulation shall protect the connection from water induced electrical corrosion and accidental short circuiting. Should the connection be loosened or removed during the manufacturing process another coating shall be applied after it has been refastened or replaced.

BATTERY POWER BUSS

All positive cables from the batteries shall be connected directly to a battery positive buss bar located as close to the batteries as practical. The alternator shall be wired directly to the battery positive buss bar through the ammeter shunt, if one is provided.

ENGINE STARTER AND INTERLOCK CIRCUITS

The starter solenoid(s) shall be connected directly to the battery positive buss bar. An interlock shall be provided to prevent the operator from engaging the starter when the engine is running.

BATTERY GROUND BUSS AND SINGLE POINT GROUND SYSTEM

All negative (ground) cables from the batteries shall be connected directly to a battery negative buss bar located as close to the batteries as practical. A 2/0 AWG cable shall connect the battery negative buss bar to the chassis frame. Appropriately sized ground feeder cables shall be utilized to provide a low impedance ground path to the negative buss bar for all electrical devices on the apparatus.

APPARATUS GROUND BONDING

A 2/0 AWG cable shall connect the battery negative buss bar to the chassis frame. The cab, pump enclosure (if furnished), and body structure shall be electrically bonded to the vehicle frame by with two (2) 2 AWG braided copper ground strap.

EMI/RFI PROTECTION

The apparatus electrical system and related devices shall have the ability to function in the severe electromagnetic environment typical of fire ground operations.

EMI/RFI EMISSIONS

State-of-the-art electrical system design and components shall be utilized to ensure the suppression of radiated and conducted EMI (electromagnetic interference) and RFI (radio frequency interference) emissions that may cause communication and navigation radio-reception interference. The electrical system and related components shall comply with the applicable sections of J551/1 *Performance Levels and Methods of Measurement of Electromagnetic Compatibility of Vehicles, Boats (up to 15 m), and Machines (16.6 Hz to 18 GHz)*

EMI/RFI SUSCEPTIBILITY

The apparatus electrical system shall incorporate immune circuit designs, filtering, shielding and twisted-pair wiring to control EMI/RFI susceptibility. Particular attention shall be given to harness and cable routing to minimize the potential for conducted and radiated signal susceptibility.

Electrical / electronic equipment on the apparatus shall not be susceptible to radiated and conducted EMI/RFI emissions from on-board radio transmitter(s) and shall comply with the requirements of SAE J551-12 *Vehicle Electromagnetic Immunity--On-Board Transmitter Simulation.*

ELECTRICAL SYSTEM PERFORMANCE TESTING

An operational test shall be conducted to ensure that all installed electrical equipment is properly connected and is in working order. The apparatus alternator shall be tested with the total continuous electrical load applied and engine running up to the engine manufacturer's governed speed for a minimum of 2 hours. Additionally, all warning lights shall be run continuously during the three (3) hour NFPA pump certification test (or at another time for not less than three (3) hours). Activation of the load management system (if furnished) shall be permitted during this test.

An alarm sounded by excessive battery discharge, as detected by the low voltage warning system, or a system voltage of less than 11.8 V dc at the battery for more than 120 seconds, shall be considered a test failure.

CAB DASH AND INSTRUMENTS FOR 2013 EMISSIONS ENGINE

A non-glare instrument panel, custom designed to accommodate the appropriate functions, shall be provided. Illumination shall be provided for controls, switches, instruction plates, gauges, and instruments necessary for the operation of the apparatus. The cab dash shall be forward slanted, and constructed of aluminum.

A system shall be provided that interacts with the engine electronics and eliminates redundant senders and switches. The electronic engine gauges shall receive information on the SAE J1939 data link to improve reliability and gauge accuracy. Connectors shall be utilized for ease of service. The dial face shall be black with white lettering. The primary letters shall be in Imperial with the secondary, smaller letters in metric. The dial shall have international non-language symbols for the gauge function (except speedometer). Gauges shall have illumination with a monochrome LCD display located on the speedometer gauge. They shall also have a 250 degree dial sweep for greater definition of scale. SAE J1939 Faults and Warnings shall be displayed on the LED display.

DRIVER'S INSTRUMENTATION

The following gauges shall be provided:

Main Gauges

3" Speedometer:	0-85 mph with built-in LCD display
Speedometer Mode Switch:	Allows operator to select menu items in the display screen
Speedometer Up Switch:	Allows operator to scroll up through display menu items
Speedometer Down Switch:	Allows operator to scroll down through display menu items
3" Tachometer:	0-4000 rpm

Satellite Gauges

2" Fuel Level: indicator	Empty – full with low level warning
2" Voltmeter:	10-16 VDC
2" Coolant Temperature:	100-240 Degrees Fahrenheit
2: Engine Oil Pressure:	0-80 psi
2" Transmission Oil Temp:	100-320 Degrees Fahrenheit

2" Front Air Pressure: 0-150 psi
2" Rear Air Pressure: 0-150 psi
2" DEF Level: Empty – full with low level warning indicator

DRIVER'S INDICATOR LIGHT MODULE

The following indicators shall be mounted in a removable modular panel in front of the steering column. The indicators shall be identified with universal ISO 2575 symbols where applicable and visible to the driver while seated.

All applicable indicators in the modular panel shall automatically illuminate for 1 second upon activation of the ignition switch to verify operation:

Battery Switch "On" green indicator light
Ignition Switch "On" indicator
Check Transmission amber indicator light
Check Engine amber indicator light
Stop Engine (Engine Warning) red indicator light
High Exhaust Temperature (HEST) amber indicator light (if applicable)
Diesel Particulate Filter Regeneration (DPF) amber indicator light (if applicable)
Wait to Start amber indicator light (if applicable)
Malfunction Indicator Light (MIL) amber indicator light (if applicable)
ABS warning amber indicator light
ATC/ESC activated amber indicator light
Spring (Parking) Brake "On" red indicator light
High Beam "On" blue indicator light
Low air pressure red indicator light
Left Turn signal green indicator light
Right Turn signal green indicator light
General Warning red indicator light (if applicable)
DEF Level Indicator Light

AUDIBLE CAB ALARMS

Audible alarms shall be provided in the cab to alert the operator of conditions that require attention. The alarm device(s) shall be audible in the driving compartment and feature an adjustable volume control. An intermittent audible tone shall sound when the following conditions are present and the parking brake is disengaged:

Active Hazard Warning –
(Do Not Move Apparatus; Door Open, Tower Raised, Ladder Rack Down, etc.)
Seat Belt Warning

A steady audible tone shall sound when the following conditions are present:
Check Engine
Check Transmission
Stop Engine (includes High Engine Temperature and Low Engine Oil Pressure)
Low Voltage
Engine Air Filter Restriction
Jackknife Warning (if applicable)
Tiller Cab Operator Not in Position (if applicable)

DRIVER'S AND OFFICER'S CONTROLS

The following rocker style control switches shall be identified and accessible to the driver while seated. Switches shall include integral indicator lights (where applicable) to advise that the switch has been energized and identification labels shall be illuminated for night driving.

Ignition switch with green indicator light
Engine Start switch
Headlight / Tail-Marker-ID light switch
Instrument Panel Dimmer control rheostat

The following controls shall be stalk mounted on the steering column and identified and visible to the driver while seated:

Turn Signal Control and 4-Way Hazard Warning switch
High-beam headlight switch
Windshield wiper control switch
Windshield washer control switch

The following controls shall be identified and accessible to the driver while seated:

Parking (Spring) Brake Control
Other controls (as defined elsewhere in this specification)

The following controls shall be identified and accessible to both the driver and officer while seated. Controls shall be identified and

illuminated for night driving.

HVAC control panel
High Idle control switch
Other controls (as defined elsewhere in this specification)

EMERGENCY & WORK LIGHT SWITCH PANEL - DRIVER'S SIDE

All emergency light and work area lighting control switches shall be mounted in a removable panel located in the overhead position on the driver's side of the cab. The light switches shall be "rocker" type with an internal indicator light (where applicable) to show when the switch is energized. All switches shall be properly identified by an illuminated label for night driving.

A master warning light switch and individual switches shall be provided to allow pre-selection of emergency lighting.

DOOR AJAR/HAZARD INDICATOR LIGHT (DO NOT MOVE APPARATUS)

A Whelen "T0" series 2" round red flashing LED light with chrome flange shall illuminate automatically whenever the apparatus parking brake is not fully engaged and any of the following conditions exist:

Any passenger or equipment compartment door is open.
Any ladder or equipment rack is not in the stowed position.
Stabilizer system is not in its stowed position.
Powered light tower is extended.
Any other device permanently attached to the apparatus is open, extended, or deployed in a manner that is likely to cause damage to the apparatus if the apparatus is moved.

The hazard warning light shall be identified with a label that reads: "Do Not Move Apparatus When Light Is On." The light shall be located on the ceiling between the driver and the officer.

DIGITAL CLOCK

A 12/24 hour real-time digital clock shall be identified and visible to both the driver and officer while seated.

ELECTRICAL WIRING REQUIREMENTS - INTELEX™ PLUS

The apparatus shall be equipped with an INTELEX™ PLUS

management system for control of the electrical system devices, where applicable.

CIRCUIT PROTECTION

Circuit protection devices shall be utilized to protect each electrical circuit. All circuit protection devices shall be sized according to 125% of the anticipated load to prevent wire and component damage when subjected to extreme current overload.

SOLID STATE CIRCUIT PROTECTION

Intelex power distribution modules shall utilize solid state output channels and feature fully protected high-side drivers (+12V) to protect wiring. High-side drivers shall provide overload protection, current limitation, transient protection, and replicate the function of an automatic reset circuit breaker. If output current exceeds the rated amperage, the output shall automatically turn off. After 30 seconds, the module shall attempt to re-energize the load. If the output is still overloaded, it shall remain off until the power is cycled. In the event of a communications loss with the vehicle's control module, all outputs not controlling a moving device, such as a ladder rack, shall remain in their previous state until communication is restored or the power is cycled.

NON-SOLID STATE CIRCUIT PROTECTION

Circuit breakers shall be Type-I automatic reset (continuously resetting) and conform to SAE J553 or J258 unless operational requirements and/or safety concerns dictate Type-III manual reset type conforming to SAE J1625. Automotive-type fuses conforming to SAE J554, J1284, J1888 or J2077 shall be utilized when required to protect electronic equipment.

POWER CONTROL RELAYS AND SOLENOIDS

Power control relays and solenoids shall have a direct current (dc) rating of 125 percent of the anticipated current load.

BUSSMANN MVEC RELAYS AND CIRCUIT PROTECTION

Manufactured as a hardened and weather tight module, the mVEC is rated at 200 Amps. The mVEC is configured to provide various OEM circuit protection and switching functions, using industry standard fuses, relays and breakers, with the status and control of

each circuit accessible through J1939 CAN open messages. Each mVEC is rated at 200 Amps, with individual outputs rated up to 30 Amps. Waterproof to high pressure spraying (IP66 equivalent). The mVEC is designed and manufactured with robust features such as heavy-duty housing, silicon and Gortex gasketing, and protective conformal coated electronics, to operate in demanding vehicle environments such as those found in fire apparatus.

INFORMATION CENTER II

A 6.5" transflective high resolution TFT color display capable of displaying graphical images as well as text messages shall be located on the cab dash. The main display page shall include the date and time and shall indicate what soft buttons will display additional pages. Additional information pages shall be provided for the seat belt status, warning indications, not stowed indications, and open doors. Information pages shall be selected for viewing by the operator by selecting a corresponding button on the display module.

APPARATUS STATUS INDICATORS AND AUDIBLE ALARMS

If a monitored "Not Stowed" or "Warning" condition is active, the corresponding status indicator shall flash. In addition to visual indicators, audible alarms shall sound when designated conditions activate the “Not Stowed” and “Warning” status indicators.

WARNING INDICATOR

A flashing red triangle symbol shall alert the vehicle occupants of an active "WARNING" condition. This is defined as a situation or status on the vehicle that is of high priority or "mission critical" nature. The flashing red triangle shall be displayed on the Information Center and dash gauge panel in front of the driver. The following are typical "Warning" (high priority) conditions:

HYDRAULIC FILTER	LOAD MANAGE	LOW AIR PSI
CAB NOT LOCKED	LOW VOLTAGE	
AIR RESTRICTION	ABS FAULT	

NOT STOWED INDICATOR

A flashing Not Stowed indicator shall alert the vehicle occupants of an active "Not Stowed" condition. This is defined as a situation or status on the vehicle that is not of high priority or "mission critical" nature, but requires attention before the vehicle is put in motion.

The following are typical "Not Stowed" (not high priority) conditions:

DECK GUN RAISED

The following items are considered Not Stowed only when the parking brake is released.

Q2B TILTED		
LIGHT TOWER UP	DECK GUN RAISED	DS TELELIGHT UP
STEP DOWN	PS TELE LIGHT UP	
DS HATCH OPEN	PS HATCH OPEN	

AUDIBLE ALARMS

The following conditions shall cause the audible alarm to sound "steady" (not an intermittent beep); signifying a "mission critical" condition exists that requires immediate attention.

STOP ENGINE	CAB NOT LATCHED	LOW VOLT
LOW AIR	ABS FAULT	CHECK ENGINE
LOW COOLANT	CHECK TRANSMISSION	LOW OIL PRESSURE

Corresponding "Low Air", "Stop Engine", "Check Engine", and "Check Transmission" visual indicators shall be located in the dash gauge panel in front of the driver.

The following conditions shall cause a chime alarm to sound "intermittently" (i.e., beep), once the parking brake is released, signifying a condition exists that may become "mission critical" if not quickly addressed.

ANY LIGHT NOT STOWED
ANY BODY DOOR OPEN
ANY CAB OR CREW CAB DOOR OPEN

OPEN DOORS / DEPLOYED EQUIPMENT RACKS / EXTENDED STEPS

When a cab or compartment door is open, a step is extended, or equipment (i.e.,ladder) rack is deployed, the "DOORS" indicator shall flash. Pressing the corresponding button shall display an overhead graphical representation of the apparatus. This image

depicts the open cab door(s), open compartment door(s), deployed equipment rack(s), and/or extended step(s). The chime alarm shall also sound when the parking brake is released.

AUTOMATED ELECTRICAL LOAD MANAGEMENT SYSTEM

The apparatus shall be equipped with an automated load management system. The load management system shall monitor battery voltage and activate the engine high idle system (provided NFPA interlocks have been established) before disabling any electrical loads. If engine high idle is not available or activation does not result in sufficient battery system voltage, individual electrical loads shall be automatically and sequentially deactivated until voltage returns to an acceptable level. Loads shall be sequentially reactivated to avoid a sudden large voltage demand on the system. Electrical loads defined in NFPA 1901 as "minimum continuous" shall not be subject to automatic load management. Load prioritization shall be independently field programmable by authorized users.

If the load management system becomes active, the "LOAD MANAGE" indicator shall illuminate on the "Warnings" page.

LOAD SEQUENCER

A sequential switching device shall automatically energize the specified optical warning devices to minimize potentially damaging voltage fluctuations due to the sudden addition or removal of large current demands on the electrical system. Upon activation of the "EMERGENCY MASTER" warning switch and provided the individual optical warning device switches are also activated, the following loads shall be activated (or deactivated) in 0.5 second intervals:

Front Light Bar
Side Light Bar (if applicable)
Front and Rear Flashing Lights
Side Warning
Rear Beacons
High Beam Headlight Flash

DATA RECORDER

A LifeGuard Technologies on-board electronic recording device shall record select apparatus status and usage information. The data logging unit shall communicate with all major vehicle component electronic control units, including engine, transmission, anti-lock

brakes and the body electrical system controller. It shall record seat belt status of ten seat positions. The data logger shall also communicate with the RollTek System if present. All recorded events shall include date and time stamped information.

The recorder shall be capable of recording 100 engine hours' worth of minute-by-minute data. When memory capacity has been reached, the system shall erase the oldest data first. All data stored shall be uploadable by the user to a computer and importable into a data management software package. The software shall be capable of running on both Windows and Apple operating systems and shall be capable of producing reports over a specified time range. Reports shall include: Raw second-by-second data, daily logs for the time the engine is running for a given data, weekly summaries showing maximum values each hour for each day, monthly summaries showing maximum values each day for every day of the month.

ELECTRICAL SYSTEM DIAGNOSTICS

The apparatus shall feature on-board electrical system diagnostics and provision for off-board diagnostic service equipment.

ON-BOARD DIAGNOSTICS

On-board diagnostic indicators shall be provided to support rapid troubleshooting of the INTELEX™ PLUS based electrical power and signal system. The input and output status of each INTELEX™ PLUS system module shall be easily determined through easy to use display pages.

Switches shall be provided in the cab to allow the operator or service personnel to obtain On-Board diagnostic information from the ABS system and Engine Controller. A troubleshooting guide shall be provided with the vehicle to assist with interpretation of the diagnostic signals.

OFF-BOARD DIAGNOSTIC PROVISION

A USB interface port shall be provided for service access to the INTELEX™ PLUS data bus. The diagnostic port shall be mounted inside the cab on the driver side in a location that is accessible from the ground.

PUMP ENGAGEMENT CONTROLS AND INDICATORS

One (1) green indicator light shall be installed in the driving

compartment, which shall indicate when the pump shift has been completed and shall be labeled "Pump Engaged". A second green indicator light shall also be provided in the driving compartment and also on the pump operator's panel. These two (2) lights shall be energized when the pump shift has been completed, the chassis transmission is engaged in pump gear and the parking brake is applied. The light in the driving compartment shall be labeled "OK To Pump". The light on the pump panel shall be located just above the throttle control and shall be labeled "Throttle Ready". Indicator lights in the cab shall be located adjacent to the pump shift control.

The "Throttle Ready" indicator on the pump panel only illuminates when the pump is engaged.

12 VOLT PLUG(S) AND RECEPTACLE(S)

Two (2) 12 volt power plug receptacle(s) and cover(s) shall be provided on the officer's side of the dash and shall be wired battery direct. The plug and receptacle are made from corrosion resistant marine grade materials. The plug locks into the receptacle providing a positive moisture proof connection.

REAR VIEW CAMERA SYSTEM

A Zone Defense rear view camera system, #ZD-323-1-4-22-400D, shall be installed. The camera shall be mounted on the rear upper bulkhead, close to center. The system shall consist of the following items:

- One (1) 7" color LCD 22 pin,digital monitor, 182mm wide x 122mm high x 26mm thick with speaker 7G rated, #ZONM302D-22.
- One (1) Zone Defense ZONC313C Color camera with 1-3" Color CCD Sensor, True Zero Light Night Vision with 18 infrared LEDs and a microphone 120 degree lens, 10G, 1P69K rated..
- One (1) remote control, #ZON402-302C.
- One (1) Zone Defense Pana-vise mount, #ZONB400D, shall be used to mount the monitor. Pana-vise mount shall be a T-bolt all-metal construction, pedestal mount with a 6" rise and adjustment knob.
- One (1) 65 foot cable, #ZONCBL358.
- All required mounting hardware.

BATTERIES

Six (6) Champion 12V Group 31 950 CCA batteries shall be installed

three each side of the cab under the rear entrance way. Heavy-duty battery cables shall be provided to maximize power available to the electrical system.

JUMPER CABLE STUDS

A pair of jumper cable studs with color coded covers shall be provided under the driver's side battery box.

BATTERY BOXES

Battery compartments shall be constructed of **stainless steel** with structural steel tubes at the corner mounting points and shall be located one (1) each side mounted on the vehicle frame. They shall be well ventilated and enclosed to protect against road splash and debris. Suitable provisions shall be provided for drainage.

The batteries shall be held firmly in place by providing a full frame type top clamp which encloses the battery set on all four (4) upper corner sides. The one piece clamp shall be fabricated of 3/4" angles and be held in place by two (2) "J" shaped clamping bolts. Battery inspection shall be available by tilting the full tilt cab.

SELECTOR SWITCH - BLUE SEA 9003

A master load disconnect switch shall be provided between the battery positive buss bar and the remainder of the switched battery electrical loads on the apparatus. A green "battery on" pilot light that is visible from the driver's position shall be provided.

One (1) single battery system switch mounted near the driver's side front entrance in a location so it may be turned off by a person standing on the ground outside the vehicle. It shall have the capacity to handle 350 amps of continuous power.

AIR COMPRESSOR/BATTERY CHARGER

A Kussmaul model #091-9-1000 "Pump Plus 1000" combination air compressor/battery charger shall be installed. The 12 volt compressor will automatically replace air lost due to leakage in the brake system without any interference to engine mounted air compressor functions. The 12 volt automatic battery charger shall maintain a single battery bank with capabilities to 15 amperes maximum output. A 3 amp battery saver shall be included in the system to operate whenever AC power is applied to the charger. It shall power vehicle accessories, such as handlight chargers, and

remove their load from the battery while the charger is plugged in to 120 VAC, returning their load to the apparatus batteries when the 120VAC is disconnected. A remotely located bar graph display shall indicate the state of charge of the batteries whenever the system is connected to 120 VAC.

The unit shall be located on the floor behind the driver's seat.

BATTERY CHARGER COVER

A smooth aluminum cover shall be provided over the battery charger. The outside finish shall match the cab interior finish.

AUTO EJECT PLUG

A Kussmaul model #091-55-20-120, 120 VAC, 20 amp "Super Auto Eject" shoreline power connector shall be provided for the battery charger. The shoreline power connector shall be provided with a spring loaded cover to prevent water from entering when the shoreline is not connected. A label shall be permanently affixed at the power inlet that indicates the line voltage in volts and the current rating in amps.

UPPER RAISED BEZEL SURROUNDS, WITH PANELS

A custom raised and chrome plated bezel shall be installed on the front face of the cab, on each side of the front grille. Housed within each bezel shall be a removable panel, painted job color. The removable panel shall provide service access to the forward side, firewall mounted electrical connections and wiring harness.

HEADLIGHTS

Two (2) Sylvania Silverstar H4656ST high/low beam bulbs and two (2) Sylvania Silverstar H4651ST low beam only bulbs shall be mounted on the front cab face to the left and right of the engine cooling intake grille. The headlights shall be quad type, rectangular halogen with bright finished trim rings and bezels. The low beam headlights shall be located at the outer position.

ALTERNATING FLASHING HEADLIGHTS

The chassis high beam headlights shall flash alternately controlled by a rocker switch.

FRONT DIRECTIONAL FLANGES

A pair of chrome plated flanges shall be provided for the Whelen M6RC series front directional lights. One (1) M6HDLMKY flange shall be located on each side of the cab front face.

FRONT DIRECTIONAL LIGHTS

There shall be one (1) Whelen M6rc LED amber a directional signal light installed on each side of the cab front face.

LIGHTS

Exterior cab lighting shall meet or exceed Federal Department of Transportation, Federal Motor Vehicle Safety Standards and any National Fire Protection Association requirements in effect at the time of proposal.

Five (5) Weldon 9186-1500-20, amber LED type clearance and identification lights shall be surface mounted across the top leading edge of the cab roof.

A Techniq S34 amber LED marker light shall be recess mounted in a rubber sealing grommet placed in the lower side of the front cowl, on each side of the cab. The light body shall be urethane filled to ensure against moisture intrusion. These cowl mounted lights shall have 100,000 hour life and shall carry a manufacturers 10 year warranty.

Seven (7) Techniq S34, red LED marker and clearance lights shall be installed at the rear of the body. The three light identification cluster shall be surface mounted on the rear step vertical flange. Two lights shall be placed at each lower rear body corner, facing the side. Two lights shall be placed in the upper rear body corners, facing the rear.

TURN/MARKER LIGHTS

One (1) TruckLite model 60115Y LED amber turn/marker light shall be provided and installed forward of a single rear axle or between tandem rear axles on each side of the vehicle. The lights shall have black flanges and shall be installed under the body.

LICENSE PLATE LED LIGHT & BRACKET

A steel license plate bracket, painted black, shall be installed on the rear of the vehicle. Mounted on the license plate bracket shall be a chrome light bracket containing a 12 volt LED lamp that shall

illuminate the license plate.

D.O.T. REFLECTORS

Reflectors shall be placed on the cab and body as required by Federal standards. An amber reflector, Signal Stat, model 32ADB, shall be placed on each side of the cab. Four (4) Signal Stat model 32DB red reflectors shall be located on the rear face and sides of the body. The reflectors shall be rectangular in shape.

SIDE DIRECTIONAL LIGHTS

Britax model #428, short rubber side directional lights shall be provided in addition to the front turn signals. One (1) light shall be mounted just above the front fender on each side of the cab. Lamp shall have an amber plastic lens at front and a red lens facing rear.

BRAKE/TAIL LIGHTS

Two (2) Whelen series M6 LED red brake/tail lights, model M6BTT, shall be vertically mounted, at the rear of the apparatus, one on each side. All brakes lights shall be shall be programmed for "steady burn" operation in compliance with FMVSS No. 108.

TURN SIGNAL LIGHTS

Two (2) Whelen series M6 LED amber arrow turn lights, model M6T, shall be vertically mounted, at the rear of the apparatus, one on each side.

BACK UP LIGHTS

Two (2) Whelen series M6 minimum intensity clear LED back up lights, model M6BUW, shall be mounted at the rear of the apparatus, one on each side.

BEZELS

Three (3) pair of Whelen M6FCV4 Flange chrome plated bezels shall be provided for the Whelen M6 series rear stop, turn, and backup lights.

REAR PICKUP LIGHTS

Two (2) Unity 6" chrome plated deck lights with H7635 halogen spot type bulbs shall be installed at the rear of the apparatus. Each light

shall be manually operated and switched on and off at the light. A switch shall be provided in the cab. This switch shall be dependent upon the switch on the light.

LIGHT ACTIVATION

The cab ground and step lights shall be activated with the cab door open switch.

The step and ground lights on the body shall be activated with the parking brake in conjunction with the marker lights.

CAB STEP LIGHTS

Eight (8) TecNiq model EON, LED step lights shall be provided, two (2) at each cab entrance door. They shall be mounted one (1) above and one (1) below each intermediate step.

BODY STEP LIGHTS

Four (4) TecNiq Eon, LED horizontal step lights with a polished stainless steel flange shall be surface mounted, one (1) on each side of the rear step area to illuminate the rear step and one (1) on each side on the forward face of the side compartments.

GROUND LIGHTS

Four (4) weatherproof TecNiq #T410 LED ground lights shall be provided underneath the cab, per NFPA requirements.

GROUND LIGHTS

Two (2) weatherproof TecNiq #T410 LED ground lights shall be provided underneath the body rear step, per NFPA requirements.

GROUND LIGHTS

Two (2) weatherproof TecNiq E10 LED ground lights shall be provided underneath the pump enclosure, one each side, per NFPA requirements.

ENGINE COMPARTMENT WORK LIGHT

One (1) Truck-Lite 4094SW engine compartment work light with integral switch shall be provided and wired to illuminate automatically when the cab is tilted. The light shall also be wired through the

engine compartment access door switch, providing illumination of fluid dip sticks and coolant overflow reservoir.

PUMP MODULE WORK LIGHTS

Two (2) Truck-Lite 4094SW pump module work lights shall be installed, one (1) on the left side behind the master gauge panel and one (1) on the right side behind the removable panel. Each light shall have a switch on it.

INTERIOR CAB DOME LIGHTS

Four (4) Weldon 8086-6978-68 red/clear lights with push button shall be mounted in the cab ceiling. Two (2) in front (driver & officer) and two (2) in the crew cab. All lights shall be controlled by a switch by the lens.

AUTOMATIC DOOR SWITCHES

Automatic door switches shall be provided for the cab dome lights.

EXTERIOR COMPARTMENT LIGHT(S)

Six (6) exterior compartment(s) shall be provided with a Weldon 2630-0000-30 incandescent light mounted on a "hat" shaped metal bracket welded to the compartment ceiling or side wall to eliminate mounting holes through the top of the compartment. Each light shall be automatically illuminated by opening the respective compartment door. A switch, installed in the door frame, shall be used to activate the light. Lights shall not have any other individual switch on the light base.

LIGHTBAR

A Whelen model #FN72VLED 72" Freedom™ LED lightbar shall be provided on the cab roof. The lightbar shall consist of four (4) 4" x 3" Linear-LED® forward facing, and four (4) corner Linear-LED®s, one (1) in each corner. All lights shall be red, except for two (2) on the front of the lightbar, which shall be clear. These clear lights shall be located one each side near the corner LED.

MINI LIGHTBAR

Two (2) Whelen model #FT8RR00F Mini Edge Ultra Freedom™ 28.25" Super-LED® front facing lightbars shall be provided and installed on the cab roof over the rear doors, facing outward to the

sides. Each lightbar consists of two (2) FLDRR 400 series red LED light heads and two (2) red corner Linear-LED® light heads located one (1) each side in the forward corners.

UPPER REAR WARNING LIGHTS

Two (2) Whelen model B63M7RR lights shall be provided on the upper rear of the apparatus. The upper level shall consist of a red Super-LED® rotator light. The lower level shall consist of an amber Linear Super-LED® light.

WARNING LIGHTS

Ten (10) Whelen model M6RC red linear Super-LED® warning light(s) with chrome plated flange(s) shall be installed on the apparatus. The flash pattern of the light(s) shall be Triple Flash, also known as Comet Flash.

Location of each perimeter warning light shall be:

1 on each side of the cab front, inboard of the turn signal
1 on each side of the cab bumper extension
1 on each side of the cab, above the wheelwell
1 on each side of the body, above the wheelwell
1 on each side of the rear of the body, below the back-up lights

TRAFFIC ADVISOR™

A Whelen TAM85 500 series TIR6™ Super-LED® Traffic Advisor™ shall be provided. The light bar shall be 46.82" wide and consist of eight (8) Super-LED® lamp modules mounted in a low profile flat style housing. The light shall be controlled by a TACTLD1 control head mounted in the cab.

The control head for the traffic arrow shall be mounted on the top center of the dash.

AUDIBLE WARNING DEVICES

One (1) automotive electric horn controlled by the steering wheel horn button shall be provided.

BACKUP ALARM

One (1) Preco Model LDA-50 backup alarm shall be provided and activated when the vehicle transmission is placed in reverse. Alarm

output shall be a minimum of 97 DBA.

DUAL AIR HORNS

Two (2) Grover 1510 chrome air horns shall be furnished. A pressure protection valve shall be installed in-line to prevent loss of all air from the vehicle air brake system.

AIR HORN DUAL LANYARD

The air horn(s) shall be activated by two lanyard pull cords, one for the officer and one for the driver, terminating into one control valve, located between the driver and officer.

WHELEN SIREN

A Whelen model 295SLSA1 electronic siren shall be provided in the front bumper. The siren has a selectable output of 100 or 200 watts. The microphone shall be hard-wired.

SIREN SPEAKER(S)

One (1) Whelen Projector Series SA-122FMP, 100-watt speaker(s) with polished grille shall be recess mounted in the front bumper extension.

MECHANICAL SIREN

A Federal Signal Model Q2B® siren with chrome plated housing shall be recessed mounted in the front bumper extension with front and vane grille exposed. There shall be an electric brake control installed in the cab, at the driver's switch panel, properly labeled.

MECHANICAL Q2B FOOTSWITCH

One (2) Linemaster Model 491 momentary foot operated switch(es) to activate the mechanical Q2B siren shall be installed on the toe board of the cab floor. One on the drivers side and one on the officers side.

PUMP OPERATOR STAND

A 54" wide modular operator stand with top mount controls, shall be installed between the cab and the apparatus body, with a forward crosswalk / pump operator's platform immediately behind the cab.

The operator stand shall be independently mounted and furnished with flex joints between the cab and the body to allow for flexure of the chassis frame during road travel. (No exceptions to this requirement). The operator stand substructure shall be fabricated of 304 stainless steel structural shapes and formed 304 stainless steel plate and shall also support the side running boards. It shall be installed on the chassis with a four point isolator arrangement that allows it to flex independently of the chassis frame. A Tech Products rubber isolator shall be used at each mounting point for this purpose. The substructure, including the pump and plumbing shall be removable from the vehicle as one complete unit. The aluminum ceiling of the operator stand shall be fastened with stainless steel machine screws so that it may be removed for access to the pump and piping as required.

Removable 304 stainless steel panels, full height and width, shall be provided on both sides of the operator stand and a stainless steel pump access door shall be provided on each side of the vehicle. Each door shall be hinged along the top and held closed with compression latches or held open with gas struts.

An 8" knurled grab rail shall be provided on the right and left side, at the top of the pump panel.

CONTROL PANEL

All pump controls and gauges shall be located on the top front of the operator stand at a convenient height for the 95-percentile operator. All gauges and controls shall be mounted on an inclined stainless steel panel with color coded identification plates for all panel mounted controls and gauges. The top mount operator stand design shall incorporate minimal use of bell cranks in valve linkages.

The following controls and gauges shall be located on the control panel for convenient operation:

- All discharge controls
- Electronic engine throttle or governor
- Primer control
- Tank fill control
- Tank to pump control
- Master discharge gauge
- Master intake gauge
- 1/4" NPT Allen head pressure and vacuum test plugs
- Auxiliary cooler control
- Master pump drain control
- Individual pressure gauges
- Water level indicator

CROSSLAY BEDS

There shall be two (2) crosslay hose beds provided at the top of the operator stand, just behind the control panel. The bottom of each crosslay shall be a maximum of 60" from the running board stepping surface. Each hose bed shall have the capacity to carry a minimum of 300 feet of pre-connected 1.75" double jacketed hose.

The interior sides of the hose bed shall be constructed of aluminum and shall have a DA finish. The interior of the hose beds shall be smooth and free from all sharp projections which might damage hose.

One adjustable crosslay hose bed partition (divider) shall be provided, constructed of 3/16" thick 5052-H32 aluminum alloy plate. It shall have a DA finish. The divider shall be fully adjustable at each end of the hose bed. The divider shall be held in place by two (2) bolts at each end of the partition's bottom flange. The bottom of the crosslay hose beds shall be provided with a Matflex bed for ventilation for the stored hose.

OPEN BIN

A 19.4" wide open bin area shall be provided atop the operator stand, behind the control panel. The walls surrounding the open bin shall be 15.75" high. The outward facing walls shall be vented as necessary for equipment such as a generator or other device which requires air flow and is located within the open bin.

OPERATOR STAND EXTERIOR FINISH

Pump panels and inspection doors, on both sides of vehicle and including the sides and front of the top mounted gauge and control panel, shall be brushed stainless steel. The outward facing exterior stainless steel surfaces of the open bin, if present, shall also be brushed.

TOP MOUNT WALKWAY

An aluminum treadplate walkway shall be provided between the cab and the operators stand. The walkway area shall consist of 19" of aluminum treadplate and a 1" gap between the walkway and the operator stand. The walkway shall serve as a standing surface for the operator and shall be shielded from excess engine heat and noise.

PUMP MOUNT BRACKET

A set of mounting brackets shall be used to mount the operator stand and the water pump as one complete module to the apparatus

chassis. This system shall be mounted at four points to the chassis frame and shall incorporate flexible isolators to absorb stresses from chassis twisting and vibrations.

PUMP PANEL LIGHTS

The top control panel shall have three (3) TecNiq E10 LED lights and each side shall have one (1) TecNiq E10 LED light located beneath a full length shield to illuminate the pump panel controls and gauges.

PUMP PANEL LIGHT ACTIVATION

One (1) of the lights on the top control panel of the operator stand shall be activated when the pump is engaged.

PUMP PANEL LIGHT SWITCH

A switch on the pump panel shall activate the pump panel lights not already activated by either the pump engaging or the marker/ground lights & parking brake combination.

The walkway shall be illuminated by three (3) TechNiq Eon LED lights, in high polished stainless steel cases, surface mounted in the front of the operator's stand. The lights shall be activated by the running lights in conjunction with the parking brakes.

WATEROUS PUMP

Pump shall be a Waterous CSU single stage 2000 GPM midship mounted centrifugal type, carefully designed in accordance with good modern practice. The pump shall be the class "A" type and be tested at the manufacturer's facility and certified by an independent testing organization.

The pump shall deliver the percentage of rated discharge at pressure indicated below.

100% of rated capacity at 150 PSI net pump pressure
70% of rated capacity at 200 PSI net pump pressure
50% of rated capacity at 250 PSI net pump pressure

Pump when dry shall be capable of taking suction and discharging water with a lift of 10 feet in not more than 30 seconds through 20 feet of suction hose of the appropriate size.

The pump shall have a two-piece, horizontally-split body with intake and discharge passageways in a single casting and on the same level providing the lowest possible height, a lower center of gravity, and more room for hose reels, hose beds and other equipment. The two-piece, horizontally-split pump body design allows removal of the bottom pump cover without disturbing the main pump body mounting or any piping.

The casing shall be made of high-tensile, close grained gray iron. All passageways shall be carefully matched to assure the very best hydraulic flow characteristics.

Diametrically opposed dual stripping edges and a double-intake bronze impeller shall balance radial and axial forces, contributing to smooth operation and long life. Flame-plated impeller hubs shall be standard to assure longer life despite the presence of abrasives in the water supply.

An exclusive two-piece impeller shaft shall allow true separation of the pump and pump transmission without disassembling either unit, greatly reducing repair labor time. The heat-treated stainless steel impeller shaft shall be ground at all critical areas and polished under packing.

Three deep-groove, anti-friction ball bearings shall be located outside the pumping chamber, giving support and proper alignment to the impeller shaft assembly.
Bearings shall be oil or grease lubricated completely separated from the water being pumped, and protected by seal housing, flinger rings and oil seals.

Flinger rings shall be located on the impeller shaft between seal housings and bearing housings to provide added protection and keep water and foreign matter out of the bearings.

Bronze, reverse-flow, labyrinth-type wear rings shall resist water bypass and maintain high efficiency and lasting performance. These replaceable wear rings increase pump life and minimize maintenance costs.

A Waterous C20 pump transmission shall be rigidly attached to the pump body assembly and be of latest design incorporating a high strength, involute tooth form Morse™ HV chain drive capable of operating at high speeds to provide smooth, quiet transfer of power. The shift engagement shall be accomplished by a free-sliding collar

and shall incorporate an internal locking mechanism to insure that collar will be maintained in ROAD or PUMP position.

PUMP ANTI-CORROSION SYSTEM

An anti-corrosion system shall be installed to prevent galvanic corrosion within the pump. It shall consist of two (2) sacrificial zinc anodes. One shall be installed on each of the 6" main inlets. Anodes shall be easily removable for inspection and replacement.

PUMP PACKING

Bearings to be protected from water and sediment by stuffing boxes with square graphite rings of packing at each end of impeller shaft. Packing to be held in place by split bronze glands which are fully removable and adjustable. Replaceable bronze wear rings to be provided.

PUMP SHIFT

An air operated shift system shall be provided that allows the shift arm position to be changed by means of an in-cab mounted switch. It shall engage either the pump drive gear or the truck drive shaft gear. A three-position positive lock air shift shall be provided.

TRANSMISSION LOCK UP

The direct gear transmission lockup for the fire pump operation shall engage when the pump shift control in the cab is activated and the transmission shift is changed to "Drive".

INTAKE PRESSURE RELIEF VALVE

A 2-1/2" Task Force Tips intake relief valve shall be permanently installed to the pump intake manifold. It shall have minimum pressure adjustment of 75 to 250 PSIG. The surplus water shall be plumbed to the underside of the truck away from the operator.

INTAKE PRESSURE RELIEF VALVE

A 2-1/2" Elkhart intake relief valve shall be permanently installed in the front inlet piping. It shall have minimum pressure adjustment of 75 to 250 psi. The surplus water shall be plumbed to the underside of the truck away from the operator.

PRIMING DEVICE

Priming pump shall be a Waterous Model VPO electrically driven, positive displacement, rotary vane type. It shall operate without the use of sealing oil, i.e. be of oil-less design and not require an oil tank. Motor shall be totally enclosed to prevent dust, dirt and water from entering. Priming pump shall be built by the manufacturer of the fire pump.

PRIMING VALVE

Priming valve shall be operated by a push pull lever control on the pump panel. Pushing the button shall automatically open the priming valve and activate the primer motor at the same time, thus being a one hand operation.

PRESSURE GOVERNOR

A Class 1 "Captain" Electronic Pressure Governor shall be provided. A pump panel control module shall be provided on the operators control panel.

When the unit is in Pressure Mode, the display will show PSI. Pump pressure is controlled by the increase and decrease switches. Initially, the pressure will ramp slowly when the switch is pressed down and will ramp more rapidly after the switch is held for more than three seconds. The controller will maintain the last pressure attained by these switches.

When the unit is the RPM Mode, the display will show RPM. Engine speed is controlled by the increase and decrease switches. Initially, RPM will ramp slowly when the switch is pressed down and will ramp more rapidly after the switch is held down for more than 3 seconds. The controller will maintain the last speed attained by these switches.

Pushing the appropriate button is all that is needed to transfer from one mode to another. Pressing the RED idle switch will automatically return the engine to idle speed.

When the throttle is active, the cab accelerator shall be inhibited to prevent inadvertent operation of the cab accelerator, which could result in a sudden and dangerous increase in pump discharge pressure.

PUMP PANEL ENGINE GAUGES - CLASS1 ENFO IV

A Class 1 "ENFO IV" shall be provided. The ENFO IV provides the pump operator with engine rpm, oil pressure, engine temperature and electrical system voltage. The ENFO IV shall utilize the SAE J-1939 bus for engine information. The voltage shall be displayed from the battery. This compact unit contains all required

engine audible and visual alarms including the voltage warning. It shall be battery switched.

AUXILIARY COOLING SYSTEM

A supplementary heat exchange cooling system shall be installed to permit use of water from the discharge side of the fire pump to reduce the temperature of the antifreeze solution circulating through the engine cooling system.

PUMP PIPING –STAINLESS STEEL, MANIFOLD AND HIGH PRESSURE HOSE

All suction and discharge lines shall use schedule 10 stainless steel pipe or heavy duty pressure/vacuum hose with stainless steel end fittings. Sweat soldered copper tubing is not acceptable. Where vibration or chassis flexing may damage or loosen piping, the pipe shall be equipped with Victaulic or rubber couplings. All discharge and gated inlet lines to drain through individual drain valves. All individual drain lines are to be extended to drain below chassis frame.

A stainless steel discharge manifold shall be used to feed the discharges, 2-1/2" or less, as required by the plumbing layout.

All discharge caps on the apparatus 1-1/2" or larger shall be vented (except for the aerial rear inlet/outlet).

All threaded fittings shall be sealed with a heavy duty Teflon anaerobic pipe sealant. It shall be in a liquid form with a consistency similar to grease. Teflon tape shall not be acceptable. It shall be designed to prevent corrosion between the mating surfaces and to allow for easy disassembly of the joints if necessary. Permabond shall manufacture with a trade name of Perma-lok.

All water carrying pressure gauge lines are to be of flexible tubing to prevent breakage from vibration. All suction inlets and discharge outlets shall be equipped with National Standard Threads (NST).

The entire pump and plumbing system shall be hydrostatic tested up to 250 psi by the manufacturer.

MASTER DRAIN - FIRE PUMP

A master drain valve shall be provided and installed. The drain assembly shall be constructed of brass and stainless steel with individually sealed ports for low point drainage of the fire pump and

auxiliary devices.

DRAINS

A Class One .75" quarter turn ball drain or bleed off valve shall be provided for each gated hydrant inlet or discharge outlet. The valve shall be mounted in an accessible location. The valve controls shall be properly labeled. The water discharged from the valve lines shall be routed so it is exhausted below the chassis frame rails.

TANK TO PUMP LINE

A 3" full flow tank to pump valve shall be installed between the water tank and the pump. The valve shall be a quarter turn ball type, drop out design and be constructed of bronze. The control handle shall be a chrome locking type lever installed on the top mount pump control panel. A check valve shall be installed between the pump and the valve to prevent water from flowing back into the tank.

INLET AND OUTLET LEVER CONTROLS

Lever type controls shall be provided for all inlet and outlet valves (space permitting). They shall be Innovative Controls specially designed for operating valves from a top mounted operators panel. The control shall be chrome plated zinc "T" handle design with a recessed area in its face for a 7/8" x 2-7/8" identification plate. The handle shall incorporate a spring-loaded mechanism which shall automatically lock the control in place when the "T" handle is released. The mounting extrusions shall have a built-in pump panel hinge that eliminates the need for slots and trim rings on the pump panel. All controls shall actuate without binding, per the manufacturer's requirements.

ELKHART VALVES

All direct and in-line valves shall be Elkhart "Unibody" swing-out valves. Unibody valves shall have a stainless steel ball turning in dual self-adjusting seats for bi-directional seating with no o-rings to cut or tear during service. Valves shall be designed for operating pressures to 250 psi.

MASTER GAUGES

A pair of Ashcroft compound gauges shall be provided for the master Pump Intake and master Pump Discharge gauges. The gauges shall be 4.5" in diameter and have a pressure range of 30-0-600 and shall dampen vibration and pulsation. The gauges shall be the dry

type for optimal performance in freezing temperatures. The gauge body and bezel shall be stainless steel construction with black lettering on white faces. The gauges shall each have an adjustable pointer and a vent hole to assist with condensation.

The master gauges shall be grouped together on the pump operator's control panel for ease of observation during pump operations, as required by NFPA 1901.

PRESSURE GAUGE(S)

Ten (10) individual line pressure gauge(s) for the 1.50" and larger discharges shall be furnished. The gauge(s) shall be 2.5" in diameter and have a pressure range of 30-0-600 and shall dampen vibration and pulsation. Each gauge shall be the dry type for optimal performance in freezing temperatures. The gauge body and bezel shall be stainless steel construction with black lettering on white faces. Each gauge shall have an adjustable pointer and a vent hole to assist with condensation.

FUEL GAUGE

A 2" weatherproof fuel gauge shall be mounted on pump panel indicating the amount of fuel in tank. The gauge shall be mounted in a well lighted area for night operations.

AIR HORN BUTTON

A red momentary push button shall be provided on the operator's pump panel to activate the air horn(s).

WATER TANK LEVEL GAUGE - MASTER

The apparatus shall be equipped with a Class 1 "Intelli-Tank" tank level gauge for indicating water level. The tank level gauge shall indicate the liquid level on a 4-light LED display and show increments of 1/8 of a tank.

The Class 1 "Intelli -Tank" tank level gauge utilizes a pressure transducer that mounts on the outside of the tank for sensing water or foam levels. No probes are required for the tank.

The lights shall be interlocked with the parking brake to operate only with the parking brake set.

PUMP INLETS

A 6" pump manifold inlet shall be provided on each side of the vehicle. Removable die cast zinc strainers shall be provided in each side inlet to provide cathodic protection for the pump and thus reduce corrosion in the pump. Each inlet shall extend past the pump panel and shall allow a minimum of 8" clearance to the outside edge of the running board.

MONARCH INTAKE VALVE PACKAGE(S) - ELECTRIC CONTROL

Three (3) Waterous Monarch Intake Valve package(s) shall be provided. This package includes an intake butterfly valve with integral relief valve, designed to fit behind the pump panel. The Waterous Monarch package features a Jamesbury Wafer-Sphere high performance butterfly valve. The Monarch package shall feature an electric rotary actuator with an electric control display(s) and LED position indicator(s) located on the primary pump control panel. A pressure relief valve shall be provided that is factory set to 125 PSI and field adjustable from 75 to 250 PSI. The pressure relief valve shall provide overpressure protection for the suction hose even when the intake valve is closed. The outlet of the pressure relief valve shall discharge flow away from the pump operator's position..

The butterfly valve(s) shall be located on the: Left & right side of pump and front intake.

2-1/2" HYDRANT INLET(S)

One (2) 2-1/2" gated hydrant inlet(s) shall be furnished on the right and left side of the pump enclosure. The valve shall be recessed behind the panel and shall be provided with a swing valve control extending through the panel. The valve shall be of the drop out type. Inlet shall terminate with a 2-1/2" NST female swivel adapter and screen.

FRONT 5" PUMP INLET

The apparatus shall be provided with a 5" front pump inlet. It shall be installed with the hose inlet at the right side corner of the cab front bumper.

The inlet shall be constructed of schedule 10 stainless steel piping and shall enter the inlet manifold section of the pump. Galvanized or black iron (steel) pipe is not an acceptable alternative.
Connection to the pump shall be via a bolted flange, threaded pipe turned into the manifold will not be acceptable. The front suction

shall be a welded fabrication utilizing sweep type welded pipe elbows. Threaded pipe and elbows shall not be used in the design of the front inlet. Piping shall be routed under the cab and over the front axle in the right side wheel well area. It shall be mounted to the chassis frame (not cab or body) with heavy duty support brackets.
The multi-piece assembly shall be connected together with Victaulic couplings. They shall prevent damage to the piping when the chassis frame twists or flexes. Also they shall provide a means of disassembly and removal of any individual piping section if necessary because of accident or for easier access to other damaged areas or places requiring special maintenance needs. Front inlet piping shall be removable without having to remove the cab.

Total assembly shall be fully engineered, and not a "make on job" fabrication where future replacement parts cannot be ordered from the apparatus builder. Bidder may be required to provide evidence of his ability to supply engineering drawings of the front inlet assembly and its individual parts.

TANK FILL

There shall be a 3" pump to tank fill line installed with a 3" inline valve. Valve shall be controlled at the pump panel with a chrome locking handle.

FRONT BUMPER DISCHARGE

(1) 1.5" pre-connect discharge shall be located in the front bumper extension. The discharge shall be plumbed from the pump with 2" and 2.5" plumbing. It shall have a manual full flow quarter turn valve with push/pull control and a pressure gauge. The discharge shall end in a chrome plated 90 degree swivel elbow.

CROSSLAY DISCHARGES

Two (2) 1.5" discharges shall terminate in the crosslay hose beds. Each shall be plumbed with 2" high pressure hose and/or piping and a 2" ball type bronze valve, terminating with a 1.5" NST 90 degree swivel outlet in each hose bed. The valve control and pressure gauge for each hose
bed pre-connect shall be installed on the pump operator's panel.

2-1/2" LEFT SIDE DISCHARGE(S)

One (1) 2 1/2" discharge(s), each with a pump mounted, quarter turn ball valve and pressure gauge shall be located on the left side panel.

Each valve shall be capable of being locked or unlocked at the valve from the control panel at any position between open or closed and shall operate freely up to maximum pump discharge pressure. Each valve shall be mounted with the body behind the pump panel and bolted to the discharge manifold of the pump.

4" LEFT SIDE DISCHARGE

There shall be one (1) 4" discharge to the left side pump panel. The outlet shall be piped from the discharge side of the pump through an Akron 4" electric controlled valve with 4" piping. The valve shall be pump panel controlled. An open/closed indicator light module and pressure gauge shall be provided on the pump panel.

2-1/2" RIGHT SIDE DISCHARGE(S)

One (1) 2 1/2" discharge(s), each with pump mounted, quarter turn ball valve shall be located on the right side panel. Each valve shall be capable of being locked or unlocked at the valve from the control panel at any position between open or closed and shall operate freely up to maximum pump discharge pressure. The valve shall be operated, in conjunction with the pressure gauge, from the operator's panel. Each valve shall be mounted with the body behind the pump panel and bolted to the discharge manifold of the pump.

2-1/2" RIGHT REAR DISCHARGE(S)

One (1) 2-1/2" discharge(s) shall be provided at the rear of the hose bed on the right hand side. It shall be plumbed with 2-1/2" pipe. The outlet(s) shall be operated by an in-line 2-1/2" drop out type valve with control and pressure gauge at the pump panel. Victaulic or other flexible type coupling(s) shall be installed in the line as appropriate.

4" RIGHT SIDE DISCHARGE

There shall be one (1) 4" discharge to the right side pump panel. The outlet shall be piped from the discharge side of the pump through an Akron 4" electric controlled valve with 4" piping. The valve shall be pump panel controlled. An open/closed indicator light module and pressure gauge shall be provided on the pump panel.

MAIN PUMP INLET CAP(S)

Two (2) 6" NST long handled chrome plated cap(s) shall be provided for the main pump inlet(s).

LEFT SIDE AUXILIARY GATED INLET PLUG(S)

One (1) 2.5" chrome plated plug(s) and retaining chain(s) shall be provided for the left side 2.5" auxiliary gated inlet(s).

FRONT INLET ADAPTER & SCREEN

A 6" NST chrome plated adapter and screen shall be provided for the front inlet.

FRONT INLET CAP

A 6" NST long handled chrome plated cap shall be provided for the front inlet.

LEFT SIDE DISCHARGE ADAPTER(S)

One (1) 2.5" FNPT x 2.5" MNST chrome plated adapter(s) shall be provided for the 2.5" left side discharge(s).

LEFT SIDE DISCHARGE REDUCER(S), CAP(S) & CHAIN(S)

One (1) 2.5" FNST x 1.5" MNST chrome plated adapter(s) with 1.5" chrome plated cap(s) and retaining chain(s) shall be provided for the 2.5" right side discharge(s).

LEFT SIDE DISCHARGE ADAPTER(S)

One (1) 4" FNPT x 4" MNST chrome plated adapter(s) shall be provided for the 4" left side discharge(s).

LEFT SIDE DISCHARGE ELBOW(S)

One (1) 4" FNST x 5" Storz 30 degree hard anodized aluminum elbow(s) shall be provided for the 4" left side discharge(s).

LEFT SIDE DISCHARGE CAP(S) & CHAIN(S)

One (1) 5" Storz cap(s) and retaining chain(s) shall be provided for the left side discharge(s). The Storz cap(s) shall have a hard anodized finish.

RIGHT SIDE DISCHARGE ADAPTER(S)

One (1) 2.5" FNPT x 2.5" MNST chrome plated adapter(s) shall be provided for the 2.5" right side discharge(s).

RIGHT SIDE DISCHARGE ELBOW(S)

One (1) 2.5" FNST x 2.5" MNST 45 degree chrome plated elbow(s) shall be provided for the 2.5" right side discharge(s).

RIGHT SIDE DISCHARGE REDUCER(S), CAP(S) & CHAIN(S)

One (1) 2.5" FNST x 1.5" MNST chrome plated adapter(s) with 1.5" chrome plated cap(s) and retaining chain(s) shall be provided for the 2.5" right side discharge(s).

RIGHT SIDE DISCHARGE CAP(S) & CHAIN(S)

One (1) 2.5" chrome plated cap(s) and retaining chain(s) shall be provided for the right side discharge(s).

RIGHT SIDE REAR DISCHARGE ADAPTER(S)

One (1) 2.5" FNPT x 2.5" MNST chrome plated adapter(s) shall be provided for the 2.5" left side rear discharge(s).

RIGHT SIDE REAR DISCHARGE ELBOW(S)

One (1) 2.5" FNST x 2.5" MNST 45 degree chrome plated elbow(s) shall be provided for the 2.5" left side rear discharge(s).

RIGHT SIDE REAR DISCHARGE CAP(S) & CHAIN(S)

One (1) 2.5" chrome plated cap(s) and retaining chain(s) shall be provided for the left side rear discharge(s).

RIGHT SIDE DISCHARGE ADAPTER(S)

One (1) 4" FNPT x 4" MNST chrome plated adapter(s) shall be provided for the 4" left side discharge(s).

RIGHT SIDE DISCHARGE ELBOW(S)

One (1) 4" FNST x 5" Storz 30 degree hard anodized aluminum elbow(s) shall be provided for the 4" left side discharge(s).

RIGHT SIDE DISCHARGE CAP(S) & CHAIN(S)

One (1) 5" Storz cap(s) and retaining chain(s) shall be provided for the left side discharge(s). The Storz cap(s) shall have a hard anodized finish.

4" DELUGE RISER W/ AKRON ELECTRIC CONTROL

A 4" deluge gun riser shall be installed above the pump terminating in the open bin with National Pipe Thread (NPT). Location to be determined on the P. E. Drawing and approved by the customer. Piping shall be installed securely so no movement develops when the line is charged. The riser shall be gated and controlled at the pump operator panel by an Akron electric valve. The outlet shall be piped from the discharge manifold of the pump through 4" piping. An open/closed indicator light module and pressure gauge shall be provided on the pump panel.

Piping shall terminate above the pump housing floor approximately 12.5".

STREAMMASTER MANUAL MONITOR

An Akron StreamMaster model 3481 manual monitor shall be provided. The single 4" inlet monitor shall have a dual handwheel, full 360 degree horizontal and 135 degree vertical travel. The monitor is rated to 2000 GPM and comes with a Pyrolite finish.

MASTER STREAM NOZZLE

Akron Brass Master Stream Akromatic 2000 model 5170 nozzle with manual pattern control shall be provided. The nozzle shall have a flow capability of 500-2000 GPM at 80 PSI.

CAFS SYTEM - WATEROUS One Step

A. Compressed Air Foam System

The Waterous One Step™ compressed air foam system (CAFS) shall be installed to provide compressed air foam to three discharges (either (3) 1.75" hoselines or (2) 1.75" hoselines and (1) 2.5" hoseline) of the vehicle. The user must be able to operate either two (2) 1.75" CAFS handlines simultaneously OR (1) 1.75" handline and (1) 2.5" handline simultaneously.

1. **Air Compressor**

   The air compressor shall be an oil-flooded, rotary screw type, sized to supply a minimum of 150 CFM of free air at minimum of 125 P.S.I.G. The air compressor shall be capable of maintaining prolonged pressures at 125 P.S.I.G. throughout its service life. The sump/pressure vessel shall have an oil level indicator, air pressure relief valve and threaded fill cap/plug.

   A. Pneumatic Modulating Inlet Valve

The air compressor shall be controlled by a pneumatic modulating inlet valve mounted on the air end inlet. This controller shall sense air pressure and control the air delivery of the air end while maintaining constant pressure.

B. Systems with balancing pressure valves will not be permitted.

2. Air Compressor Drive

The compressor shall be belt driven directly and no clutch installment will be allowed. (150-D). The compressor shall be PTO driven. (-P) The compressor system shall operate in unload and fixed (125 PSI). The compressor system shall be automatically controlled by the CAFS controller touch screen.

3. Air Compressor Oil System

The air compressor system shall feature a spin-on, full-flow oil filter unit to control oil flow to the cooler.

A. Modular Air/Oil Separator Unit

A modular air/oil separator unit with spin-on element shall be provided with the sump tank. Replacement elements for the oil filter and separator shall be readily available.

B. Oil Lines

All oil lines shall be routed in braided hose conforming to SAE 100R1 standards for hydraulic hose.

4. Air Compressor Cooling System

The air compressor shall be cooled by the apparatus fire pump, utilizing an all copper and brass shell and tube heat exchanger. Water shall flow through the heat exchanger whenever the fire pump is operating. An in-line strainer shall be provided on the water inlet side of the heat exchanger to prevent clogging. The strainer shall be removable for cleaning.

The compressor cooling system shall be capable of maintaining recommended operating temperatures throughout its full operating range at ambient temperatures up to 115°F.

5. Air Controls and Instruments

A 7" Tellurus™ panel shall be provided to control functions of each compact foam generator. Air pressure, pressure of each ONE STEP™ CAFSystem discharge, air pressure and compressor oil temperature will be displayed by the

touchscreen. The air control should be automatically controlled by the 7" touchscreen panel. When the ONE STEP™ CAFSystem is not activated the compressor shall run in an unloaded state.

6. Plumbing

Each CAFS outlet shall have a dedicated electronically driven foam generator which must ensure the adequate and proper mixture of air, water and foam solution in order to deliver a constant, reproducible and efficient firefighting extinguishing media.

A closed loop control valve shall be supplied for total control of the water pressure supply to the foam generators for CAFS operation.

The foam generators shall have a water flow on/off function, an air flow on/off function, volume control, and check valves.

The two (2) foam generators for 1.75" handlines shall have a minimum water flow of 55 GPM of water per minute each. The foam generator for the 2.5" handline shall have a minimum water flow of 70 GPM. All foam generators shall provide an extinguishing media with a minimum expansion ratio of 6.5.

Each outlet shall be equipped with a mixing pressure control valve in order to ensure the same quality of foam at all times for the safety of firefighters.

Each outlet shall be calibrated to a constant foam flow and consistency. No manual adjustments shall be allowed in order to prevent operator error.

7. Safety Mode

In the event of a foam system / air system failure, the foam generator discharges shall be capable of having full individual pressure and flow control with or without foam.

8. System

Drawings of a top, side and rear view of these foam generating devices shall be provided during the bid.

During the bid, Pressure loss charts must be provided validation for flows and hose diameters for all three outlets.

During the bid, Maximum delivery length and height must be provided for all three outlets.

9. Foam Management System – Aquis 2.5™

A fully automatic electronic direct foam injection system is furnished and installed. The system is capable of Class A foam concentrates. The system includes the following:

A. Digital Electronic Control Display

The system shall be controlled by a screen on the 7" Tellurus™ panel. It shall be installed on the pump operators panel and enable the pump operator to perform the following control and operation functions:

1. Provide touch screen control of foam proportioning rates from 0.1% to 1%.
2. Show current flow-per-minute of water
3. Show total volume of water discharged during and after foam operations are completed
4. Show total amount of foam concentrate used
5. Flash a "safety alert" warning when the foam concentrate tank(s) run(s) low
6. Flash a "safety alert" warning in the event of an electronic malfunction.
7. Provide a manual back-up mode, controlled by the operator

B. 12 or 24 Volt Electric Motor (3/4hp) - Model: Advantus™ 6E

A 12 or 24-volt electric motor driven Hydra-Cell positive displacement foam concentrate pump, rated at 6 GPM @ 150 psi (22.6 l/min @ 10 bar) and with operating pressures up to 450 psi (32 bar).

FOAM CAPABLE DISCHARGES

The following discharges, if present, shall be foam outlets when a direct injection foam system has been installed: 1, 2 & 3 crosslays/speedlays.

FOAM PROPORTIONING SYSTEM TESTING

The foam proportioning system accuracy shall be tested using method 2 of section A.20.10.1 as specified in NFPA 1901, current edition: "Measuring Foam Concentrate Pump Output Directly".

With the foam system operating at a given water flow rate, and either foam concentrate or water used as a substitute for foam concentrate, the output of the foam concentrate pump shall be measured by diverting that output into a calibrated container for direct measurement over a measured period of time. An alternative is to measure the foam concentrate flow or water substitute with a calibrated meter.

The contractors report shall contain the following information for each foam tested:

TANK A
Set Ratio:
% and Flow Rate:
GPM to determine Foam Quantity:
Determine Gallons consumed for Run Time:
Actual Mixing Ratio:
% Lower Control Limit:
% Upper Control Limit:
The mixing ratio shall fall within the NFPA specification for accuracy: ___Yes ___No

T-TYPE WATER TANK

Booster Tank
The Tank shall have a capacity of 1000 U.S. Gallons. The tank manufacturer shall mark the tank and furnish notice that indicates proof of warranty. The purpose of the notice is to inform department personnel who store, stock, or use the tank that the unit is under warranty.
There shall be a 3" diameter threaded plug located in the bottom of the booster tank sump to provide a drain when cleaning and flushing tank of foreign substances.

Construction
The tank shall be constructed from ½" thick sheet stock material that shall be a non-corrosive stress relieved thermoplastic and U. V. stabilized for maximum protection. The tank shall be of a special configuration and is so designed to be completely independent of the body and compartments. All joints and seams shall be welded and tested for maximum strength and integrity. The top of the tank will be fitted with locations for removable lifting eyes designed with a 3 to 1 safety factor to allow for easy removal. All transverse and longitudinal swash partitions shall be equipped with vent and air holes to permit movement of air and water between compartments. The partitions shall be designed to provide maximum water flow. All

swash partitions interlock with one another and are welded to each other as well as to the walls of the tank.

Fill Tower

The tank shall have a combination vent and manual fill tower. The fill tower shall be constructed of ½" sheet stock material and shall be a minimum dimension of 8.00" x 8.00" outer perimeter. (Standard size to be 12.00" x 12.00"). The fill tower shall be not less than 12.00" high and shall be flush with the top of the body risers as standard. The tower shall be located in the left front corner of the tank, unless otherwise specified by the purchaser. The tower shall have a ¼" thick removable screen and a hinged-type cover. Inside the fill tower shall be a combination vent overflow pipe. The vent overflow shall be a minimum of schedule 40 polypropylene pipe with a minimum I.D. of 4" that is designed to run through the tank, and shall be piped behind the rear wheels so as to maximize traction. There shall be a 3/4" diameter relief hole provided in the overflow pipe at a point approximately 2.00" above the tank cover line to reduce head pressure.

Cover

The tank cover shall be constructed of ½" thick sheet stock material that is U. V. stabilized. A minimum of two lifting dowels shall be drilled and tapped to accommodate the lifting eyes.

Sump

There shall be one (1) sump standard per tank. The sump shall be constructed of ½" thick sheet stock material and be located in the bottom of the tank to the front. On all tanks that require a front suction, a 3" schedule 40 polypropylene pipe shall be installed that will incorporate a dip tube from the front of the tank to the sump location. The sump shall have a minimum 3" NPT threaded outlet on the bottom for a drain plug. This shall be used as a combination clean-out and drain. The tank shall have an anti-swirl plate located approximately 2" - 2 ½" above the sump.

Outlets

There will be two (2) standard tank outlets: one for tank-to-pump suction line which shall be a minimum of 3" coupling; one for a tank fill line, which shall be a minimum of 1" pipe, NPT coupling. All tank fill couplings shall be backed with flow deflectors to break up the stream of water entering the tank, and be capable of withstanding sustained fill rates of up to 1,000 GPM.

Mounting

The tank shall rest on cross members in conjunction with such

additional cross-members, spaced at a distance that would not allow for more than 530 square inches of unsupported area under the tank floor. In cases where overall height of the tank exceeds 40 inches, cross-member spacing will be decreased to allow for not more than 400 square inches of unsupported area. The tank will be isolated from the cross members through the use of hard rubber strips with a minimum thickness and width dimension of .250" x 2.00" and a minimum Rockwell Hardness of 60 durometer.

Additionally, the tank will be supported around the entire bottom outside perimeter and captured both front and rear as well as side to side to prevent the tank from shifting during vehicle operation. Although the tank is designed on a free floating suspension principle, the tank will have adequate hold down restraints to minimize movement during vehicle operation. If proper retention is not available or incorporated into the apparatus hose floor, an optional mounting restraint system shall be located on top of tank, half way between the front and the rear on each side of the tank. These stops will be constructed of carbon steel having minimum angular dimensions of 3.00" x 3.00" x .250" and shall be approximately 6.00" to 12.00" long. These brackets will incorporate a hard rubber isolating pad with a minimum thickness of .250" affixed on the underside of the angle. The angle will then be bolted to the body sidewalls of the vehicle while extending down to rest on the top outside edge of the upper sidewall of the tank. Internal mounting block design and hose bed floors will be so designed that the floor slat supports extend full width from side wall to side wall and are not permitted to drop off the edge of the tank or in any way come in contact with the individual covers where a puncture could occur. Hose floor loading will support up to 200 lbs. per sq. foot and will be evenly distributed whenever possible. Other equipment such as generators, portable pumps, etc. will not be mounted directly to the tank top.

FOAM TANK

A thirty (30) gallon "A" foam tank shall be incorporated into the water tank. These 30 gallons shall be in addition to the amount of water specified. The fill tower shall be a minimum dimension of 8" x 8" outer perimeter (standard size to be 12" x 12"). The fill tower shall be provided with an easy opening, hinged, latching cover. Within the fill tower shall be an anti-foaming fill pipe. The fill tower shall be constructed to facilitate complete interior flushing as required. The fill tower shall be equipped with a pressure/vacuum vent that enables the tank to compensate for changes in pressure or vacuum when filling or withdrawing foam concentrate.

146" OVERALL BODY LENGTH

The overall length of the body shall be 146". The distance from the front exterior edge of the body to the midline of the rear axle shall be 61.5". Body overall width shall be 98", fender to fender.

STAINLESS STEEL BODY CONSTRUCTION

The body and compartments shall be constructed of heavy duty 3CR12 stainless steel. The body shall be welded on external or hidden surfaces wherever possible to insure a clean compartment interior look. The compartments shall be a "sweep out" design with the floor higher than the door sill. The compartment floors shall be a minimum of 2.5 mm 3CR12 stainless steel. All compartment seams shall be caulked with gray adhesive/sealant. Each compartment shall be rated for 500 lbs. of storage. False bulkhead panels shall be provided on the inside of the forward and rearward wall of the side compartment panel to cover and protect all electrical wiring and components. This also provides a clean interior for equipment mounting. These panels shall be removable. Door frames on compartments with hinged doors shall be fabricated by flanging the door opening edges inward 1.88" and bending out again .75" to form an angle. The hose body side panels and partitions shall be raised in 5" increments to provide adequate storage for the required and specified hose load.

A bright aluminum treadplate cover shall be installed over the side compartments. The cover shall not form the compartment top but shall be an overlay. The forward and rearward edges of the cover shall be folded down 1.5" to cap the forward and rearward ends of the side compartment panel. The outside edge of the cover shall be folded down 1.5" to cap the outside of the side compartment panel and shall have a 45 degree outward bend to provide drip protection over any compartment doors which are immediately below the cover. Extruded aluminum drip molding with a bright anodized finish shall provide drip protection for any compartment doors that are not directly below an aluminum treadplate cover. The forward face of the side compartments and the face of the front cross panel above the operator stand shall be covered with a bright aluminum treadplate overlay. All body components covered with aluminum treadplate overlays shall be coated with an anti-corrosion compound prior to installation. All treadplate shall be secured with threaded fasteners.

Fender compartments shall be integral with the body side compartmentation. There shall be no sharp objects protruding into

the wheel well area that could cause injury while cleaning or doing other maintenance in this area.

BODY MOUNTING SUBSTRUCTURE

The front portion of the right and left hand side compartments shall mount to a front cross panel. The panel shall be constructed of stainless steel tubing and heavy duty stainless steel sheet metal. The front cross panel assembly shall rest on two (2) heavy duty rubber isolators. These isolators shall be bolted to brackets mounted to the chassis frame, as close to the center line of the chassis frame as possible. These center mounted isolators shall provide a pivot point which shall allow chassis movement without introducing stresses into the body. The rear portion of each side compartment shall bolt directly to the rear step support assembly, which is bolted directly to the chassis frame. The rear steel step/body support assembly shall be constructed of formed .25" and .375" plate, 2" X 3" tubes, 2" X 2" angles, and 3" structural channels in a welded assembly. The rear wall shall be reinforced with formed heavy duty panels.

LEFT SIDE COMPARTMENTS

The full height broomer right hand side panel at 146.00" long by 49.00" high shall be made of stainless steel. This panel consists of one (1) full height compartment ahead of the rear wheels, one (1) full height compartment behind the rear wheels, and one (1) upper broomer compartment above the rear wheels. The compartment behind the rear wheels has a 25.75" wide x 29.75" high transverse area through the rear tailboard compartment. It also has extended compartmentation in place of standard beavertail. This extended area is half depth in the upper area and full depth in the lower area. All compartments shall have hinged doors.

The compartment ahead of the rear wheels shall have a doorframe to doorframe dimension of 28.50" wide x 42.75" high. The clear door opening shall be 25.00" wide x 40.75" high. The usable compartment space of the lower full depth area shall be 28.50" wide x 29.75" high x 25.75" deep and the upper shallow area shall be 28.50" wide x 15.50" high x 11.75" deep. This compartment shall have a vertically hinged single door.

The compartment behind the rear wheels shall have a doorframe to doorframe dimension of 47.50" wide x 42.75" high. The clear door opening shall be 43.50" wide x 40.00" high. The usable compartment space of the lower full depth area shall be 47.50" wide x 29.75" high x 25.75" deep and the upper shallow area shall be 47.50" wide x 15.50" high x 11.75" deep. This compartment shall have vertically hinged double doors.

The upper compartment above the rear wheels shall have a doorframe to doorframe

dimension of 58.00" wide x 9.50" high. The clear door opening shall be 54.50" wide x 6.00" high. The usable compartment space shall be 63.38" wide x 12.00" high x 11.75" deep. This compartment shall have a horizontally hinged drop-down door.

RIGHT SIDE COMPARTMENTS

The full height broomer right hand side panel at 146.00" long by 49.00" high shall be made of stainless steel. This panel consists of one (1) full height compartment ahead of the rear wheels, one (1) full height compartment behind the rear wheels, and one (1) upper broomer compartment above the rear wheels. The compartment behind the rear wheels has a 25.75" wide x 29.75" high transverse area through the rear tailboard compartment. It also has extended compartmentation in place of standard beavertail. This extended area is half depth in the upper area and full depth in the lower area. All compartments shall have hinged doors.

The compartment ahead of the rear wheels shall have a doorframe to doorframe dimension of 28.50" wide x 42.75" high. The clear door opening shall be 25.00" wide x 40.75" high. The usable compartment space of the lower full depth area shall be 28.50" wide x 29.75" high x 25.75" deep and the upper shallow area shall be 28.50" wide x 15.50" high x 11.75" deep. This compartment shall have a vertically hinged single door.

The compartment behind the rear wheels shall have a doorframe to doorframe dimension of 47.50" wide x 42.75" high. The clear door opening shall be 43.50" wide x 40.00" high. The usable compartment space of the lower full depth area shall be 47.50" wide x 29.75" high x 25.75" deep and the upper shallow area shall be 47.50" wide x 15.50" high x 11.75" deep. This compartment shall have vertically hinged double doors.

The upper compartment above the rear wheels shall have a doorframe to doorframe dimension of 58.00" wide x 9.50" high. The clear door opening shall be 54.50" wide x 6.00" high. The usable compartment space shall be 63.38" wide x 12.00" high x 11.75" deep. This compartment shall have a horizontally hinged drop-down door.

VENTS

Compartment vents shall be provided to meet the requirements of NFPA 1901, current edition.

REAR ALUMINUM INNERLINERS

Full semi-circular innerliners shall be provided in each wheel housing. They shall be constructed of aluminum and shall be bolted in place so they may be removed if damaged. Self-tapping sheet metal screws are not acceptable. The bottom edge of liner shall be reinforced along its full length, however, it shall not have a formed

reinforcement flange to avoid trapping dirt and debris.

REAR FENDERETTE

Polished stainless steel fenderettes shall be installed on the rear wheel openings. The fenders shall be wide enough to completely cover the outside rear tire and reduce wheel splash up the sides of the body. They shall be installed with 1/4" hex head bolts, self-tapping sheet metal screws are not acceptable. A full width rubber welt shall be placed between the fenderette and body wheel well opening flange. The outside edge of the welting shall form a "V" bead between the fender and the body side face to prevent moisture from entering. The inside edge shall also have a small raised bead. The outside edge of fenderette, at the wheel opening, shall be rolled inward to eliminate any sharp edges and avoid injury when cleaning the apparatus.

REAR FENDER PANELS

Painted 3CR12 stainless steel fender panels shall be provided on the outer face of each fender area. The panels shall be painted to match the job color.

REAR COMPARTMENT

One (1) full height, full width stainless steel compartment shall be provided at the rear of the apparatus above the tailboard, 42.00" wide x 44.63" high x 28.00" deep. The compartment shall be transverse as standard with a 25.75" wide x 29.75" high transverse area through each rear side compartment. In the rear wall, there shall be a removable access cover adequately sized to service the fuel tank pickup tube and sending unit without having to remove the tank.

The full height compartment shall have a doorframe to doorframe dimension of 38.00" wide x 39.75" high. The clear door opening shall be 36.50" wide x 34.50" high. The usable compartment space for the area under the roll shall be 41.75" wide x 35.00" high x 26.50" deep and the area behind the roll shall be 41.75" wide x 7.25" high x 15.75" deep. This compartment shall have an aluminum shutter type roll up door.

REAR SURFACE OF BODY

The rear facing body surface around the rear compartment shall be covered with smooth aluminum in preparation for the installation of reflective chevron striping.

Adequately reinforced treadplate shall cover any front to back walls facing the step area up to the height of the hosebed floor. Then the remaining upper inside surface shall be covered with brushed stainless steel. All treadplate shall be secured with threaded fasteners.

The rear facing bulkhead of the compartments shall be painted job color.

HINGED COMPARTMENT DOORS

All compartment doors shall be lap type, double panel construction with 14 gauge outer and 14 gauge 3CR12 stainless steel inner panels. (NO EXCEPTIONS TO THIS STATEMENT.) Outer pan edges that form the lap portion of the door shall be "hemmed" (bent over and back 180 degrees) over the inner pan edges. Inside corners, at the hem area, shall be welded and ground smooth. A minimum of one (1) "Z" shaped formed 14 gauge support rail (two (2) if door is wider than 14") shall be placed between the panels to stiffen and reinforce the door. Stiffener shall be welded to the inside pan and fastened to the outside pan with 3M two sided industrial strength tape.

The doors shall be weather stripped with an automotive bulb type extruded rubber inner seal. A second outer seal of closed cell rubber shall be placed on the lap edge of the door to prevent damage to the paint finish. Outer seal shall have corrugated surface to prevent sticking.

The doors shall be mounted on stainless steel piano hinges with a pin diameter of .25". Mounting holes shall be slotted vertically on one side of the hinge and horizontally on the other side to provide for proper adjustment of the door. The hinge pins shall have spun ends (crowns) at both ends to hold them in place and provide a finished look. Eberhard 206 latches with stainless steel "D" ring handles shall be provided on the lift, single, drop down, and lock door (double door set-up). The free door (double door set-up) shall have an (2) Eberhard latches top and bottom with a single handle located inside the door (standard location at bottom). Isolation tape shall be furnished between the door hinge and door jam. A rubber gasket shall be provided between the "D" ring handle and the door.

Vertically hinged doors shall be equipped with Hansen 5EZ or Thomas EZ spring type door checks that also hold the doors in the open and closed position. Checks shall be the two point mounting type for simplicity. Spring tension (15 lb.) shall be easily adjustable. Checks shall have black zinc mounting brackets with stainless steel springs, 11" long rods and clamps. Springs shall be polished. Horizontally hinged doors shall be held in the opened position with gas cylinder type stays. Switches for automatic compartment light operation shall be installed in the door hinge area.

BODY DOORS

All exterior compartment doors on the main body shall be hinged type.

TAILBOARD

The tailboard shall be 16" deep located between the rear body compartments. The width of the tailboard between the rear body compartments shall be 42" when both compartments are 28" deep, 70" when both compartments are 14" deep, and 56" when one compartment is 14" deep and the other compartment is 28" deep. The tailboard surface shall be 3/16" thick aluminum treadplate with 2-1/2" deep flanges on the front, rear, and side edges. It shall be installed over a heavy-duty steel framework to prevent the tailboard from bending and flexing. The tailboard support shall be constructed of formed ¼"- 3/8" plate, 2" X 3" tubes, 2" X 2" angles, and 3" structural channels in a welded assembly. It shall be bolted directly to the chassis frame rails, not the body.

All mounting bolts used to fasten the treadplate to the tailboard support shall be 5/16" truss-head Phillips. Self-tapping sheet metal screws shall not be used to install the aluminum treadplate. There shall be a ½" gap between the tailboard and the body to prevent moisture from being trapped.

FINISH – BODY SIDE COMPARTMENT INTERIOR(S)

Six (6) body side compartment interior(s) shall be finished with gray Zolatone type paint following the Zolatone Coat application process.

FINISH – BODY REAR COMPARTMENT INTERIOR(S)

One (1) body rear compartment interior(s) shall be finished with gray Zolatone type paint following the Zolatone Coat application process.

DA FINISHED HOSEBED

The interior of the hose bed shall be "DA" finished only, no paint shall be provided.

HOSE LOAD

400' of 3" Dbl. jacket hose.
2000' of single jacket supply line.
400' of 3" Dbl. jacket hose.

HOSEBED

The hosebed shall be a minimum of 70" wide and shall be thoroughly reinforced at the corners. Removable aluminum grating shall be installed in the bottom of the hosebed to provide ventilation. The grating slats shall be 4-5/8" wide by 1/2" thick and shall have a corrugated or ribbed surface to help drain and dry the hose. The interior of the hosebed body shall be smooth and free from all sharp projections that might damage the hose.

Pumper Body Style:
The shape of the hosebed for a pumper body shall be rectangular, 70" wide as standard.

Rescue Pumper Body Style:
The shape of the hosebed for a rescue pumper body shall be T-shaped when the tank is shorter than the height of the body sides. The upper portion shall be 70" wide between the risers as standard. The bottom portion of the hosebed between the compartments shall be 42" wide.

Choosing options such as hatch compartments, hydraulic ladder rack, and/or split body styles (one side pumper and one side rescue) may change the width and shape of the hosebed.

HOSEBED DIVIDER(S)

Two (2) smooth aluminum hose bed divider(s) with an Etchfinish shall be provided to separate the individual hose loads. The divider shall be constructed of .1875" aluminum sheet welded to a T-shaped extruded foot that runs the full length of the partition. The divider(s) shall be fully adjustable by providing slide tracks at the front and rear of the hose bed. The divider shall be held in place by two (2) 5/16" tapered bolts at each end of the partition. The mounting bolts shall turn into threaded slide blocks located in the track. Holes in the T-shaped foot shall be countersunk so the bolt head is flush with the surrounding surface and will not damage the hose.

There shall be a handhold slot 3" from the back edge of the rear of the partition. The handhold shall be the full height of the partition beginning 3.5" from the top and bottom edges.

HOSEBED DIVIDER REINFORCEMENT(S)

A 1.25" round aluminum extrusion slotted on the bottom to fit over the top and rear edge of the partition shall be provided on two (2)

hosebed divider(s). The extrusion shall be beveled at the corner and welded in place to reinforce the partition. This option is required for partitions with excessive length or height.

HOSEBED COVER

A hosebed cover made from 16 oz. per square yard polyester shall be provided and installed over the hosebed. The cover shall be coated with a urethane top coat (vinyl). The rear of the hosebed cover shall be secured, and cover the hosebed opening.

This cover shall secure the hose from unintentional deployment while the vehicle is underway in normal operations.

COMPARTMENT DOOR SILL PROTECTOR(S)

A brushed stainless steel sill protector, approximately .50" wide, shall be provided on six (6) body compartment door sill(s) to protect the painted finish.

DRI-DEK

Twelve (12) black Dri-Dek mat(s) shall be provided and installed on body compartment floors and/or in shelves/trays as specified.

ADJUSTABLE SHELF OR SHELVES

Four (4) adjustable shelf or shelves (with open corners) made from 3/16" smooth aluminum sheet metal shall be provided in the body compartment(s). Each shelf shall be supported by four (4) stainless steel angles bolted to "alumastrut" tracks.

ROLLOUT TRAY(S)

One (1) rollout tray(s) constructed of 0.188" aluminum shall be provided in the body compartment(s). Each tray shall have edges on all four sides for added strength and be mounted on heavy duty rollers able to support a 500 lbs. load. Corners shall be open. Trays shall extend 70% of the slide length and shall be vertically adjustable on alumastrut attached to the side walls of the compartment.

ROLLOUT TRAY(S)

One (1) rollout tray(s) constructed of 0.188" aluminum shall be provided in the body compartment(s). Each tray shall have edges on all four sides for added strength and be mounted on heavy duty

rollers able to support a 500 lbs. load. Corners shall be open. Trays shall extend 70% of the slide length and shall be bolted to the compartment floor.

HURST TOOL PUMP MOUNTING

The Fire Department Supplies Hurst Duo Hydraulic pump will need to be mounted, connected to power, and connected to the hydraulic reels in the read body compartment. Exact location and logistics of getting pump to the manufacture shall be worked out at the pre-construction conference. Mounting provision must be made by the manufacture but actual mounting can be made at the local dealer.

AIR BOTTLE COMPARTMENTS

There shall be four (4) enclosures to accommodate eight (8) air bottles. Two (2) oval double air bottle compartments shall be located, two (2) each sided, with one (1) fore and one (1) aft of the rear axle. The compartments shall be fabricated of high impact polyethylene material. They shall be a minimum of 26.00" usable depth, and an 8.00" inside diameter. The double compartments shall have a single wide opening and a raised nylon center divider to prevent the bottles from rolling together.

AIR BOTTLE COMPARTMENT DOOR

The compartment doors shall be constructed of 12 gauge brushed stainless steel secured by a full length stainless steel hinge and a push button lever latch.

BODY REAR STEPS

There shall be chrome folding steps on both sides of the rear, in sufficient quantities, to meet NFPA regulations for the height configured by the body and tank chosen.

The folding steps shall be a minimum of 42 square inches of serrated non-skid surface per step. Each step shall be tested to withstand a minimum of 2000 pounds of static load. Heavy duty stainless steel springs shall be incorporated in the hinge to hold the step in either the open or closed positions.

BODY FRONT STEPS

There shall be two (2) chrome folding steps on the driver's side front of the body.

The folding steps shall be a minimum of 42 square inches of serrated non-skid surface per step. Each step shall be tested to withstand a minimum of 2000 pounds of static load. Heavy duty stainless steel springs shall be incorporated in the hinge to hold the step in either the open or closed positions.

In compliance with NFPA 1901 requirements for 3-point contact for access and egress, the following grab rails shall be provided:

One (1) 8" knurled grab rail shall be provided on the front driver's side of the body, as high as possible.

One (1) 8" knurled grab rail shall be provided on the driver's side of the pump enclosure panel as close to the body as possible.

BODY FRONT STEPS

There shall be two (2) chrome folding steps on the officer's side front of the body.

The folding steps shall be a minimum of 42 square inches of serrated non-skid surface per step. Each step shall be tested to withstand a minimum of 2000 pounds of static load. Heavy duty stainless steel springs shall be incorporated in the hinge to hold the step in either the open or closed positions.

In compliance with NFPA 1901 requirements for 3-point contact for access and egress, the following grab rails shall be provided:

One (1) 8" knurled grab rail shall be provided on the front officer's side of the body, as high as possible.

One (1) 8" knurled grab rail shall be provided on the officer's side of the pump enclosure panel as close o the body as possible.

BODY HANDRAILS

Handrails to be 1-1/4" diameter extruded, knurled, aluminum with a bright anodized finish.

All handrail stanchions shall be chrome plated. They shall be bolted to the body with 1/4" stainless steel hex head bolts. Stanchions shall have a rubberized gasket placed between them and the body surface they are mounted on. A drain hole shall be provided in each bottom stanchion.

Handrails shall be installed as follows:

One (1) handrail, a minimum of 30" long, shall be provided and installed on each rear beavertail or body side. Each handrail shall be located so as to provide a 3-point stance while climbing onto and off the rear step.

One (1) full-width intermediate handrail shall be installed below the hosebed.

Additional handrails may be required per NFPA, dependent upon body configuration.

RUB RAIL – BODY SIDES

Bright aluminum polished C-channel rub rails shall be provided along the lower portion of the body, beneath the compartment doors, on each side to prevent damage to the body and finish. The C-channel shall be mounted so the flat side of the channel is against the body and the legs of the channel protrude outward. The rub rails shall be a minimum of 2.25" wide x 1.25" deep, and shall be mounted on rubber supports. The rub rails shall have a 1.25" x 1.25" chamfer at the front and rear of the rail. The rails shall protrude 1.50" from the face of the body.

FINISH - ADJUSTABLE SHELF (OR SHELVES)

Four (4) adjustable shelf (or shelves) shall have a DA finish on the outside edge of the shelf.

FINISH - ROLLOUT TRAY(S)

One (1) rollout tray(s) shall have a DA finish applied to the outside edge of the tray.

FINISH - ROLLOUT TRAY(S)

One (1) rollout tray(s) shall have a DA finish applied to the outside edge of the tray.

GENERATOR/INVERTER TEST AND CERTIFICATION

The generator/inverter shall be third party tested at the manufacturer's facility and shall conform to NFPA requirements and standards. Copies of all tests shall be provided with the delivery

documentation.

"HOT SHIFT" PTO

A "hot shift" PTO shall be provided. The "hot shift" shall allow the hydraulic generator to be shifted into use or turned off while the apparatus is in motion or in a pumping mode. Prior to engaging the "hot shift" the RPM's of the engine must be reduced to 1200 RPM.

HYDRAULIC GENERATOR

An Onan 10.0 kW model 10CMHG genset hydraulic generator system shall be provided and installed on the apparatus. There shall be a generator enable switch installed on the cab dash. The generator weighs 194 lbs. and has dimensions of 31" long x 16" wide x 13.8" high and is encased in a silver powder-coated steel housing. The genset system shall be capable of producing the nominal output power of 10.0 kW, 120V/240V, 60 Hz. The genset shall be installed per the manufacturer recommendations and shall be capable of supplying full power during all engine speeds or operation modes. The genset shall be capable of being switched on or off at any time, with or without electrical loads applied. The genset shall be capable of continuous operation in 120ºF ambient conditions.

The hydraulic pump shall be mounted directly to the vehicle PTO when possible. An extension shaft shall be installed when it is tandem mounted to the aerial pump or if there is a 3000EVS transmission. The PTO ratio shall be selected to allow genset operation through out the entire engine RPM range; idle to full throttle. The hydraulic pump shall have a standard SAE mounting flange and splined shaft.

The hydraulic system reservoir shall be mounted at least 2' above the pump and shall have access for fluid filling, draining and viewing the sight glass fluid level indicator. Clearance of at least 10" above the reservoir shall be provided for hydraulic fluid filter service. The reservoir shall be equipped with a remote drain and valve below the framerails. The system reservoir shall be labeled with the type and approximate amount of fluid required. All connecting hydraulic hoses and fittings shall be of the size and pressure rating specified by the manufacturer. The hoses shall be adequately protected from chafing or abrasion during operation.

A display meter consisting of 4 numeric LED displays shall be provided. The meter shall simultaneously display system voltage, frequency and amperage in each of the two 120V legs. The meter

shall also have provisions for toggling to total hours run and oil temp via a mode switch. A high temperature visual indicator shall be provided and installed.

BREAKER BOX

A twelve (12) place Square D brand, or approved equal, gray colored breaker box shall be provided and installed in the front upper left hand side compartment. Manual reset circuit breakers, matching the rated output of each specific outlet or device, shall be provided. All power supply assembly conductors, including neutral and grounding conductors from the line voltage power source to the circuit breaker box shall have an equivalent amperage rating and shall be sized to carry not less than 115 percent of the amperage of the nameplate current rating of the power source. Power supply conductors shall be run in nonmetallic liquid tight flexible conduit or type SO/SEO cord with a WA suffix. Conduit shall have a temperature range of -67°F (-55°C) to 221°F (105°C).

Wiring conductors from the circuit breaker box to the individual outlets and devices shall be sized in accordance with NFPA 70, *National Electrical Code* requirements. Branch circuit wiring conductors shall be run in (1) metallic or nonmetallic liquid tight flexible conduit rated for use in a temperature range of -67°F (-55°C) to 221°F (105°C) with stranded copper wire rated for wet locations and temperatures not less than 194°F (90°C) or (2) Type SOW, SOOW, SEOW, or SEOOW flexible cord, rated at 600 volts and at temperatures not less than 194°F (90°C). A power source specification label shall be permanently attached to the apparatus near the operators control panel.

The door of the breaker box shall have a side hinge.

120 VOLT SHORELINE POWERED RECEPTACLE(S) IN CAB INTERIOR

One (1) 120-volt, 20 amp, 3-wire receptacle(s) shall be provided in the cab interior in accordance with NFPA guidelines. A brushed stainless steel coverplate shall be provided to protect the receptacle. The receptacle shall be powered by the shorepower inlet and labeled accordingly.

CORD REEL(S)

Two (2) Hannay Model ECR1618-17-18 power rewind cord reel(s) for live electric cable shall be provided. The reel(s) shall be 12 volt

electric rewind and be equipped with an electrical collector ring with a minimum #10 gauge, 4-conductor wiring. Capacity of each reel shall be a minimum of 200 feet 10/3 gauge electric cable.

The cord reel shall be installed over the pump stand, one each side:

HOSE ROLLER ASSEMBLY

Cable reel shall be equipped with a captive roller assembly mounted directly on reel frame. It shall be supplied by Hannay and have a 4-way roller assembly with stainless steel rollers mounted in a stamped steel housing.

CORD REEL CABLE(S)

Two (2) 200 foot length(s) of 10/3 type SO electric cable shall be provided and installed on the cord reel.

CABLE STOP

A molded plastic spherical type stop shall be provided near the end of the cable. It shall prevent damage to the electrical plug or connection when the reel is rewound. Stop shall be drilled for the correct cable size. It shall be a two piece design that clamps over the cable by tightening two bolts. Bolts shall be recessed into the ball to keep them from damaging the roller assembly when it is fully retracted.

ELECTRICAL JUNCTION BOX

An Akron Brass 4-receptacle junction box shall be provided for distribution of electrical power on the fire ground. The box shall be constructed of aluminum and shall be completely powder coated in high visibility yellow with gray hinged protective receptacle covers and the full length carry handle. Internally lighted faceplates shall provide sufficient light to make connections and alert the crew that the box is in "power-on" status. The junction box shall have dimensions of 9.25" long x 5.5" wide x 8.5" high. The box shall be equipped with a 12-inch pigtail with a wire mesh cord grip and a L5-20 connection.

A total of four (4) NEMA L5-20R Twist Lock, single receptacles shall be provided. Each receptacle shall be rated for 20 amps at 125 Volts. A mounting box, with brushed stainless finish, shall be provided for the junction box.

CAB FRONT BROW MOUNT SCENELIGHT(S)

One (2) Whelen Pioneer model PBA0130 mount(s) shall be installed on the cab front brow. The brow mount shall be adjustable to 15 degrees downward angle.

BODY SIDE SURFACE MOUNT SCENELIGHT(S)

One (1) surface light mount(s) for Whelen lamphead(s) shall be installed on the side of the body.

BODY REAR SURFACE MOUNT SCENELIGHT(S)

One (1) surface light mount(s) for Whelen lamphead(s) shall be installed on the rear of the body.

Four (4) Whelen model PCPSM1B lighthead(s) shall be provided. Each light shall have a Black plainted flange.

Two (2) Whelen model M6ZC, 12 volt, 12 diode LED, 6.75" x 4.3125" lighthead(s) with 8 to 32 degree optics shall be provided. Each light shall have a chrome plated flange.

Two (2) Whelen Pioneer Plus model PCP2, 12 volt, 13 amp, Super-LED dual lamp flood/spot, light head(s) shall be provided.

One (1) Whelen lightheads shall be painted black.

All 12 volt light(s) shall be switched at the cab dash.

LED LIGHT TOWER

One (1) Will-Burt Powerlite model NS3.0-600WHL extendible lighting system shall be installed rear cab roof mounted side to side and hinged to driver. The lighting is provided by a Will-Burt 12 volt DC RPC directional lighting system with rotation and tilt quartz halogen lamps to provide total coverage. The tower pneumatically extends vertically up to 10 feet. The remote control unit allows you to operate all Night Scan functions and accurately aim for complete directional positioning. In addition, AutoStow, a one button command, automatically retracts, turns out the lights and stows the entire system to the compact horizontal transporting position.

• The operational envelope of the light mast shall be automatically illuminated whenever the mast is being raised, lowered with the required NFPA look-up light.

• The lighting system shall include four (4) 150 watt 120 volt Whelen Pioneer PFP2AC LED light fixtures with an output of 14,000 lumens each.

• One button adjustable AutoStow provides error-free convenience to retract and stow system and shut off the lights automatically when being stowed.

• Heavy duty aluminum and stainless steel weatherproof construction provides long life for components exposed to water and weather.

• A hand held pistol grip remote control on a 25 ft. cord controls the aiming of lights. The up/down switch and AutoStow switch, which allows for quick and accurate pointing of lights and raising of light tower and automatically shuts off the lights when being stowed. The control shall be located next to the breaker box.

• Full 360 degrees of lighting coverage provides complete lighting coverage of emergency or work scene.

The overall size of nested light tower shall be approximately 44-1/2" wide x 62-5/8" long x 11-5/8" high.

Light Tower Control Location

Relocate light tower controls in place of standard placement. Location: officer side upper corner of top mount pump panel.

HYDRAULIC HOSE REEL

Two (2) Hannay Model EF2220-17-18 electric rewind reel shall be provided. The hose reel shall be designed to allow operation of a hydraulic tool away from the power unit and rescue vehicle. The reel shall have an oven-cured enamel finish, graphite shade silver in color. The reel drum and frame shall be constructed of heavy gauge steel. Bearings shall be self-aligning. The hose reel shall be powered by a 12 volt DC electric motor with a chain and sprocket drive for efficient deployment. The reel shall be equipped with push-button control #90030 in a position where the operator can safely observe the rewinding operation.

The reel shall be equipped with 4-way "C" Rollers, and a HS-35 hose stop.

HYDRAULIC RESCUE HOSE

The reel(s) shall be equipped with (100) feet of Hurst hydraulic hose to supply pressurized fluid to a tool and return fluid back to the

power unit reservoir. The lines shall be constructed of thermoplastic with a Kevlar reinforcement and have a maximum working pressure of 10,500 psi. Both inner and outer lines shall have a 4:1 safety factor.

The hose shall include Hurst couplings on one (1) end to attach to the hydraulic tool and the other end shall connect directly to the hose reel.

Connection to reels and testing on fire department power unit shall be completed by fire department.

The hydraulic hose reel shall be located at pre construction meeting.

GROUND LADDERS

Ladders shall supplied by the fire department in full compliance with NFPA 1901 requirements for pumper trucks. The following ground ladders shall be provided:

Model #: LAS-1200 Details: Complete unit with 12" ladder support: The QUIC-LIFT system at a glance: Base castings come in sets of two. At the flick of a switch, the system lowers the ladders to a comfortable level for retrieval.

The switch should be mounted outside the operational envelope of the system in a location providing the operator with an uniterrupted view of ladders and personnel during removal and storage operations. Systems are easily installed on existing pumpers or tankers and require 12 VDC controlled by 30 amp two-pole, double-throw momentary switch (provided.) Works with aluminum ladders and hard sleeves commonly carried of fire apparatus. Requires a minimum compartment shelf of 13" deep. Keeps ladders and hard sleeves close to the vehicle, when lowered, for tight apparatus positioning. Flashing light kit provided to produce a visual signal when the system is out of the stored position. Mounting brackets may be attached to castings for storage of folding ladders and pike poles. Total height, above the mounting shelf is 33" for ladders and 30" for hard sleeves. Lowers ladders and hard sleeves 31" from the stored position. The basic system is made of high strength light-weight cast aluminum and has a depth of 6", less ladders. Powered by two durable high cycle electric actuators (12 V), with a maximum load of ladders, hard sleeves, etc. of 300 lbs. We recommend the manual or electric locking systems be used whenever a hard sleeve tray is mounted over the LAS or HSS systems. Systems have been tested over more than 5,000 operating cycles. QUIC-LIFT Ladder

Access System (LAS) mounts on horizontal and/or vertical surface. Ladders remain close to the apparatus when lowered. At the flick of the control switch, the QUIC-LIFT system automatically lowers any standard aluminum ladder to a covenient height for safe and easy removal. The only device of its type, the system reduces the chance of back or shoulder injury while conserving the firefighter's energy for more critical tasks. In some cases, part number 3097-250-000 spacer set will be required. In these instances the overall mounting height will be 34-1/2".

MOUNT ON RIGHT SIDE OF APPARATUS BODY

LADDER BRACKETS

There shall be two stainless steel fabricated ladder brackets with an unpainted finish used to install the ladders on the hydraulic ladder rack. The ladder brackets shall bolt to horizontal adjustable stakes on the rack.

Polished aluminum pull/quarter turn type ladder clamps shall be provided for the ground ladders. They shall be vertically adjustable up and down independent of the ladder brackets. Clamps shall be attached to a stainless steel spring loaded shaft. Clamp spring tension shall be adjustable. The spring assembly shall be fully enclosed within a white metal cast housing. Housing shall be painted a silver/gray color. A vertically adjustable rubber bumper shall be placed in the ladder bracket mounting guide to serve as a stop or rest for the inside lower ladder beam and to prevent it from hitting and damaging the body sides.

LADDER BRACKET NYLON WEAR STRIPS

The ladder brackets shall have nylon (UHMW) wear strips attached to prevent damage to the ladders.

ZICO QUIC-LIFT HARD SLEEVE SYSTEM

A ZICO QUIC-LIFT suction hose mounting assembly shall be provided on the apparatus above the side compartments. Lifting arms shall be constructed of high strength aluminum castings. Lift shall carry four (4) lengths of 6" hard suction hose. It shall swing the hose down 31" from their travel position so they may be easily removed from apparatus. It shall be power operated by two (2) 12 volt electric motors with control switch (12 VDC 30 amp momentary

switch) located in a safe position for the operator. Hose shall be carried in 1/8" thick formed aluminum trays and be securely held in place with high strength straps with hook and loop closures. A flashing light kit shall be provided to produce a visual warning signal when the system is out of the stored position.

The Zico Quic-Lift shall be located on the left side of the body.

PIKE POLES/MOUNTING

The following pike poles shall be furnished:

PIKE POLE(S)

One (1) 6 ft. Duo-Safety pike pole(s) with hollow fiberglass handle(s).

TULIP CLIP PIKE POLE MOUNT(S)

Three (3) pike pole(s) shall be mounted in tulip clips.

WHEEL CHOCKS

Two (2) Worden HWG wheel chocks shall be furnished and shipped loose by the apparatus manufacturer. Two (2) U815 holders shall be installed by the manufacturer on the left side of the body, one in front of and one behind the rear wheel(s).

SPARE HARDWARE KIT

An assortment of nuts, bolts, capscrews, washers and other hardware used in vehicle construction shall be provided.

TOUCH UP PAINT

A quart of touch up paint shall be supplied with the vehicle.

PROCESSES

The following processes shall be employed in the finishing of the apparatus:

Manual Surface preparation – All metal surfaces on all custom body and cabs shall be thoroughly cleaned and prepared for paint. Surfaces that shall not be painted include all chrome plated, polished stainless steel and bright aluminum tread plate. As required, weld seams and other areas shall be caulked to prevent water leaks or for appearance

reasons. Each imperfection on the exterior metal surface shall be removed or filled and then sanded for a smooth flat appearance.

Chemical Cleaning and Treatment – All painted surfaces shall be washed with a chemical degreaser, cleaner and surface conditioner to allow for proper adherence of primer coat. Then they shall be washed with a neutralizer product. All products used are approved by paint supplier and applied under strict process control to meet performance requirements on corrosion prevention and chip resistance.

Primer/ Surface Coating for Top Coat application – a minimum of 2 coats of Epoxy based primer shall be applied to surfaces inside and outside of cabs and bodies and all other parts of apparatus that shall receive a Top color coat to achieve required corrosion protection. After that a minimum of 2 coats of sealer shall be applied over the primer surface. The overall thickness of the primer/sealer coat shall be between 3 to 8 mils wet. Once dried and cured all surfaces that shall receive a top coat shall be hand sanded to achieve a flat and smooth surface to meet gloss and other paint quality standards. All products used are approved by paint supplier and applied under strict process control to meet performance and appearance requirements according Mfg. Paint Quality Standard. The underside of the cab and body shall be finished with one coat of epoxy primer specifically designed for this application to prevent corrosion and provide chip resistance to typical paved road conditions.

Top Coat Application – Each Top Coat final color on the apparatus is applied using a two stage paint process. The unit shall be thoroughly hand cleaned to eliminate dust residues and to detect any imperfection in the surfaces to be painted. A fast drying 3.5 VOC polyurethane basecoat color shall be applied using a cross coat application technique. Additional coats may be applied as required until the coat thickness reaches 2.0 to 6.0 mils wet and a full hide appearance. If a second color is required, proper masking shall be applied to the unit and the basecoat application process shall be repeated for the second color. A slow drying low VOC High Build clear coat shall be applied using a cross coat application technique until a minimum of 5.0 mils wet is achieved. The unit is then properly heated to assure flash and cure of the paint before leaving the paint booth. All products used are approved by paint supplier and applied under strict process control to meet performance and appearance requirements according to Mfg. Paint Quality Standard.

Each batch of color topcoat shall be tested for precise color match following paint supplier color matching process. A visual color match shall be checked prior to paint using customer approved paint chips.

The cab and body shall be primed and finish painted prior to installation on the chassis to ensure paint coverage in all areas including the difficult to reach places. The exterior and interior of the cab shall be finish painted before the doors are installed or any assembly is started to ensure a finish painted surface beneath all trim items.

Primer/ Surface Coating for Single Coat application – a minimum of 2 coats of Epoxy based primer shall be applied to all surfaces of the apparatus that shall receive a single color coat to achieve required corrosion protection. This is a wet coat process and it shall achieve a 3.0 to 8.0 mills wet thickness and complete coverage of all bare metal. All products used are approved by paint supplier and applied under strict process control to meet performance and appearance requirements according with Mfg. Paint Quality Standard.

Single Coat Application – A minimum of 2 coats of direct gloss paint shall be applied over all primed surface to achieve corrosion protection and appearance in accordance with Mfg. Paint Quality Standard. This application shall be used for Gloss Black, Job Color and Color finishes in parts of the apparatus such as frame rails, outriggers, ladders and other aerial devices, suspension and other chassis parts, etc. as defined in the sales order.

Zolatone Coat Application – All areas to receive a Zolatone coat shall be primed following the primer/surface coating for top coat application. A high pressure coat of Zolatone paint shall be applied in a cross pattern technique to achieve smooth finished surface. A second low pressure coat of Zolatone paint shall be applied in a single pattern to achieve a textured appearance.

Zolatone Clear Coat Application – Starting with a completed and dry Zolatone coat application 2 to 3 coats of Zolatone clear coat shall be applied until a thickness of 5.0 mills wet is achieved.

PAINTERS

All painters shall be paint supplier certified. They shall be re-certified periodically in order to keep up to current standards and procedures required by the coatings manufacturer. This certification is performed independently by the paint supplier.

FACILITY

The finishing facility shall be certified independently by the paint supplier by meeting or exceeding its extensive and stringent requirements. The paint facility shall be audited quarterly by the paint supplier to ensure proper equipment, procedures and safety regulations are being used and adhered to in addition to the controls implemented by Mfg. to assure paint quality requirements are met in every job.

QUALITY STANDARDS

The finish quality and appearance shall be in accordance with the Mfg. Paint Quality Standards for dirt, gloss, reflectivity, clarity and depth of image. The standard is available to the customer at any time upon request.

FRAME & UNDERCARRIAGE FINISH

The following items shall have an additional coat of gloss black paint applied over the primed surface as supplied by the component manufacturer. Single coat appliction process shall be used to apply Gloss Black direct gloss paint on the parts identified below:

Chassis frame rails, cross members.
Front bumper extension.
Front & rear axles and suspension.
Battery boxes.
Fuel tank and fill tube.
Air reservoir tanks.
Pump module mounting brackets.
Body mounting brackets.
Steering gear box and steering link arm.
Drive shafts.
Front suction (when furnished).

The following items will be furnished with the finish as provided by their respective manufacturer.

Engine, transmission and accessories.
Exhaust system.
Retarder (when furnished).
PTO & hydraulic pump (when furnished).
Cab lift cylinders & hydraulic pump.
Shock absorbers.
Fuel filter.

Air drier and air cleaner.
Electrical wiring and loom.
Air brake lines, valves and mounting brackets.

PAINT INSIDE OF CAB

The inside of the cab shall be provided with gray Zolatone paint following the Zolatone Coat application process.

The following components shall be painted:
Exposed interior surfaces of the cab structure
Exposed interior surfaces of the driver/officer/crew doors
All interior "Metal" access/wire covers of the cab
Head bumper brackets
Miscellaneous brackets, if present: camera mounts, non-recessed radios, charger covers.

TWO TONE CAB PAINT

The cab shall be two tone painted with the paint break just below the windshield. The paint shall follow the Top Coat application process for two colors.

Cab Upper Exterior Paint Black Paint #_____

Cab Lower Exterior Paint Yellow Paint #_____

A decorative molding shall separate the two colors around the cab. The paint break shall be horizontal across the front of the cab above the wipers and taper down with a radius even with the outside corners of the grille.

BODY PAINT, SINGLE COLOR

The body of the apparatus shall be painted to match the primary cab color. The paint shall follow the Top Coat application process for a single color.

Body exterior paint number shall be Yellow Paint #_____

OPERATOR STAND FINISH

The operator stand compartment interior, pump, intake and discharge valves, drains, drain lines, and foam system components, and all hard piping, shall have mill finish.

All exposed pipe (not including cut threads) at the rear of the truck or welded pre-connect assemblies at the front of the body shall be painted.

ACORN NUTS

Acorn nuts shall be installed on all exposed screws and bolts in areas where personal injury may result and/or damage to equipment may occur. For further details, please refer to the enclosed standards document.

UNDERCOATING

The apparatus shall be properly undercoated with PPG Corashield.

The underside of the vehicle, including body and cab, shall receive a spray-on application of black Corashield which is a heavy duty, pliable, waterborne, zero-VOC product with excellent resistance to chipping, cracking and corrosion. It shall also have excellent soundproofing qualities. The material shall be sag resistant and applied to a mil thickness of 5 to 10 with a cure time of 72 hours.

The material shall be applied in the following areas:

- Body and cab, fender wheel well areas.
- Underside of body compartments and cab floor structure.
- Underside of body sub-frame.
- Exterior of body compartment rear walls, up to top of water tank.

FRAME TREATMENT

A corrosion barrier film shall be sprayed to all surfaces of the chassis frame rail(s) and crossmembers after frame assembly. Manual touch up shall be applied where/as necessary. The barrier shall be a corrosion inhibiting sealant which shall provide extreme resistance to abrasion and chemical deterioration. The sealant shall pass US Miltiary spec MIL-C-0083933A for bend resistance, chip resistance and flexibility. It shall pass ASTM B117 (1000 hours corrosion resistance test standard).

REFLECTIVE STRIPING

A 4" reflective stripe shall be provided around the perimeter of the vehicle. At least 50 percent of the cab and body sides, at least 50 percent of the rear body width and at least 25 percent of the width of the cab front shall have reflective material affixed to it per NFPA

standards.

CHEVRON STRIPING

The rear facing body panel under the hose bed shall be covered with 6" wide reflective striping in an alternating Scotchlite Red #680-72 and Scotchlite Yellow #680-71 chevron pattern with the stripes running at a 45 degree downward angle from the top center of the vehicle.

LETTERING

Sign Gold brand gold leaf lettering, pin striping and 3M NFPA reflective striping shall be supplied by the dealer prior to apparatus delivery. The lettering and striping shall match as closely as possible the Haddam Vol. Fire Department pumper design.

SUTPHEN MONARCH CUSTOM CHASSIS

A Sutphen Monarch Severe Duty Cab and Chassis system shall be provided. The chassis shall be manufactured in the factory of the bidder. The chassis shall be designed and manufactured for heavy duty service with adequate strength and capacity of all components for the intended load to be sustained and the type of service required. The cab and chassis system, shall be considered the bidders "Top of the Line".

There shall be no divided responsibility in the production of the apparatus.

FRAME

The chassis frame shall be of a ladder type design utilizing industry accepted engineering best practices. The frame shall be specifically designed for fire apparatus use. Each frame rail shall be constructed of two 3/8" thick-formed channels. The outer channel shall be 10.06" x 3.50" x .375" and the inner channel (liner) shall be 9.31" x 3.13" x .375". The section modulus shall be 31.28 $in.^3$. The resistance to bending moment (RBM) shall be 1,569,160 in./lbs. The cross-members shall be constructed of minimum 3/8" formed channels and have formed gusseted ends at the frame rail attachment.

.625 inch, grade 8 flange, Huck bolt fasteners shall be used on all permanently attached brackets to the frame to eliminate the need for bolt re-tightening.

A lifetime warranty shall be provided, per manufacturer's written statement.

FRONT TOW EYES, BELOW BUMPER

There shall be two front tow eyes with 3" diameter holes attached directly to the chassis frame, accessible below the front bumper.

TOW EYES, PAINTED FINISH

The front tow eyes shall be painted to match the color of the chassis frame.

REAR TOW EYES

There shall be two tow eyes attached directly to the chassis frame rail and shall be chromate acid etched for superior corrosion resistance and painted to match the chassis.

STEERING

The steering system shall be a TRW wheel to wheel steering system that is tested and certified by TRW, consisting of a heavy duty TRW/Ross Model TAS-85 power steering gear, TRW PS36 steering pump, miter box, drag links, and a thermostatic controlled fan cooled system (set point 185 deg. F to 170 deg. F). The steering gear shall be bolted to the frame at the cross-member for steering linkage rigidity. Four (4) turns from lock to lock with an 18" diameter slip resistant rubber covered steering wheel. Steering column shall have six-position tilt and 2" telescopic adjustment. The cramp angle shall be 45 degrees with 315mm tires or 43 degrees with 425mm tires providing very tight turning ability.

DRIVE LINE

The driveline shall consist of Spicer 1810 series dual grease fitting universal joints with "half-round" end yokes. The drive shaft shall be built with a heavy-duty steel tube 4.095" outside diameter x .180 wall thickness. The shafts shall be dynamically balanced prior to installation into the chassis. A splined slip joint shall be provided in each shaft assembly. Universal joints shall be extended life. There shall be two (2) Zerk fittings in each universal joint assembly so the joint can be greased without turning the shaft.

ENGINE

The apparatus shall be powered by a Cummins Diesel ISX 12 500 HP @ 1800 R.P.M., 1645 ft. lb. torque @ 1100 R.P.M.

ENGINE WARRANTY

The engine shall have a five year or 100,000 mile warranty and approval by Cummins for installation in the chassis. There shall be no deductible for the first two years. A one hundred dollar deductible shall apply for service during the next three years.

AIR COMPRESSOR

The air compressor shall be an 18.7 CFM engine driven Wabco.

STARTER

A 12-volt starter shall be provided, controlled by a switch on the left lower cab dash.

FUEL FILTERS

The engine fuel filters shall be mounted in a manner that is easily accessible for service or replacement. A Cummins approved primary FleetGuard Fuel Pro filter

will be remote mounted to the Chassis frame rail. A secondary FleetGuard FF2200 spin on filter will be mounted on the engine.

EXHAUST SYSTEM

The engine exhaust system shall include the following components:

Diesel Particulate Filter (DPF)

Diesel Oxidation Catalyst (DOC)

Diesel Exhaust Fluid (DEF)

Selective Catalytic Reduction Filter (SCR)

The SCR catalyst utilizes the DEF fluid, which consists of urea and purified water, to convert NOx into nitrogen and water. This shall meet or exceed 2013 EPA emissions requirements.

The engine exhaust system shall be horizontal design constructed from heavy-duty truck components. The exhaust tubing shall be stainless steel to the DPF through to the SCR, aluminized steel from the SCR to the exhaust tip. A heavy duty stainless steel bellows tube shall be used to isolate the exhaust system from the engine. The system shall be equipped with single canister consisting of a Diesel Oxidation Catalyst (DOC) and a Diesel Particulate Filter (DPF), and shall be mounted under the right side frame rail, meeting the specific engine manufacturer's specifications and current emission level requirements. The outlet shall be directed to the forward side of the rear wheels, exiting the right side with a heavy duty heat diffuser. The heat diffuser shall prevent the exhaust temperature from exceeding 851 deg. F during a regeneration cycle. A heat-absorbing sleeve shall be provided on the exhaust pipe in the engine compartment area to reduce the heat, protect the alternator, and also to protect personnel while servicing the engine compartment.

AFTER TREATMENT SYSTEM

To meet EPA requirements of Particulate output, a DPF (Diesel Particulate Filter) is used. To meet EPA requirements of Nitrous Oxide output an SCR (Selective Catalytic Reduction) system utilizing DEF (Diesel Exhaust Fluid) is used.

ON-BOARD DIAGNOSTIC (OBD) SYSTEM

The engine shall be equipped with an on-board diagnostic (OBD) system which shall monitor emissions-related engine systems and components and alert the operator of any malfunctions. The OBD system is designed to further enhance the engine and operating system by providing early detection of emission-related faults. The engine control unit (ECU) will manage smart sensors located throughout the engine and after-treatment system. The system shall monitor component verification and sensor

operation. There shall be warning lights located in the dash instrument panel to alert the operator of a malfunction. A data port shall be provided under the driver's side dash for the purpose of code reading and troubleshooting. All communication shall be provided through the J1939 data link.

AIR CLEANER/INTAKE

The engine air intake and filter shall be designed in accordance with the engine manufacturer's recommendations. It shall be 99.9% effective in removing airborne contaminants when tested per the industry standard SAE J726 procedure and offer a dirt holding capacity of at least 3.0 gm/cfm of fine dust (tested per SAE J726) offering superior engine protection.

The air filter shall be located at the front of the apparatus and shall be at least 66" above the ground, to allow fording deep water in an emergency situation.

An ember separator shall be provided in the engine air intake meeting, the requirements of NFPA 1901.

An Air Restriction warning light shall be provided and located on the cab dash.

TRANSMISSION

The chassis shall be equipped with a Generation 5 Allison EVS4000 six (6) speed automatic transmission. It shall be programmed five (5) speed, sixth gear locked out, for fire apparatus vocation, in concert with the specified engine.

The transmission will be programmed to shift up to 4th gear, with 5th gear enabled with the depression of the "MODE" button on the Allison shifter.

The transmission is communicated on the J-1939 through the communication port. The fifth gear shall be an overdrive ratio, permitting the vehicle to reach its top speed at the engine's governed speed. The dipstick is dipped in a rubber coating for ease in checking oil level when hot.

The chassis to transmission wiring harness shall utilize Metri-Pack 280 connectors with triple lip silicone seals and clip-type positive seal connections to protect electrical connections from contamination without the use of coatings.

Ratings: Max Input (HP) 600

Max Input (Torque) 1850 (lb ft)

Max Turbine (Torque) 2600 (lb ft)

Mechanical Ratios: 1st - 3.51:1

2nd - 1.91:1

3rd - 1.43:1

4th - 1.00:1

5th - 0.74:1

Reverse - -5.00:1

ENGINE BRAKE

The engine shall be equipped with a Jacobs compression engine brake. An "On/Off" switch and a control for "Low/Medium/High" shall be provided on the instrument panel within easy reach of the driver.

The engine brake shall interface with the Wabco ABS brake controller to prevent engine brake operations during adverse braking conditions.

A pump shift interlock circuit shall be provided to prevent the engine brake from activating during pumping operations.

The brake light shall activate when the engine brake is engaged.

TRANSMISSION COOLER

The apparatus transmission shall be equipped with a Liquid-To-Liquid remote mounted cooler with aluminum internal components. The cooler shall be encased in an aluminum housing and mounted to the outside of the officer's side frame rail for accessibility and ease of service.

TRANSMISSION FLUID

The transmission shall come filled with Castrol TranSynd™ Synthetic Transmission Fluid or approved equal meeting the Allison TES-295 specification. **NO EXCEPTION.**

TRANSMISSION SHIFTER

An Allison "Touch Pad" shift selector shall be mounted to the right of the driver on the engine cover accessible to the driver. The shift position indicator shall be indirectly lit for nighttime operation.

COOLING SYSTEM

The cooling system shall be designed to keep the engine properly cooled under all conditions of road and pumping operations. The cooling system shall be designed and tested to meet or exceed the engine and transmission manufacturer's requirements, and EPA regulations.

The complete cooling system shall be mounted in a manner to isolate the system from vibration and stress. The individual cores shall be mounted in a manner to allow expansion and contraction at various rates without inducing stress to the adjoining core(s).

The cooling system shall be comprised of a charge air cooler to radiator serial flow package that provides the maximum cooling capacity for the specified engine as well as serviceability. The main components shall include a surge tank, a charge air cooler, bolted to the top of the radiator to maximize cooling, recirculation shields, a shroud, a fan, and required tubing. All components shall consist of an individually sealed system.

RADIATOR

The radiator shall be a cross-flow design constructed completely of aluminum with welded side tanks. The radiator shall be bolted to the bottom of the charge air cooler to allow a single depth core, thus allowing a more efficient and serviceable cooling system.

The radiator shall be equipped with a drain cock to drain the coolant for serviceability. The drain cock shall be located at the lowest point of the aluminum cooling system to maximize draining of the system.

CHARGE AIR COOLER

The charge air cooler shall be of a cross-flow design and constructed completely of aluminum with extruded tanks. The charge air cooler shall be bolted to the top of the radiator to allow a single depth core.

COOLANT

The cooling system shall be filled with a 50/50 mix. The coolant makeup shall contain ethylene glycol and de-ionized water to prevent the coolant from freezing to a temperature of –34 degrees F.

HOSES & CLAMPS

Silicone hoses shall be provided for all engine coolant lines.

All radiator hose clamps shall be spring loaded stainless steel constant torque hose clamps for all main hose connections to prevent leaks. Recirculation shields shall be installed where required to prevent heated air from reentering the cooling package and affecting performance.

FAN

The engine cooling system shall incorporate a heavy-duty composite 11- blade Z-series fan. It shall provide the highest cooling efficiently while producing the lowest amount of noise. This robust yet light-weight fan results in less wear and stress on motors and bearings.

A shroud and recirculation shield system shall be used to ensure air that has passed through the radiator is not drawn through again.

The fan tip to radiator core clearance shall be kept at a minimal distance to increase the efficiency of the fan and reduce fan blast noise.

FAN CLUTCH

A fan clutch shall be provided that shall allow the cooling fan to operate only when needed. The fan shall remain continuously activated when the truck is placed in pump gear.

SURGE TANK

The cooling system shall be equipped with an aluminum surge tank mounted to the officer's side of the cooling system core. The surge tank shall house a low coolant probe and sight glass to monitor the coolant level. Low coolant shall be alarmed with the check engine light. The surge tank shall be equipped with a dual seal cap that meets the engine manufacturer's pressure requirements, and system design requirements.

The tank shall allow for expansion and to remove entrained air from the system. There shall also be an extended fill neck to prevent system overfill and encroachment of expansion air space. Baffling shall be installed in the tank to prevent agitated coolant from being drawn into the engine cooling system.

ANTIFREEZE

The radiator shall be filled with Long Life antifreeze.

FUEL TANK

The chassis shall be equipped with a 65-gallon stainless steel rectangular fuel tank. The fuel tank shall be certified to meet FMVSS 393.67 tests. It shall also maintain engine manufacturer's recommended expansion room of 5%.

The tank shall be removable by means of six (6) bolted connections and dropped. One (1) tank baffle shall be used.

Dual pick-up and return ports with a single 3/4" tank drawtube shall be provided for diesel generators if required.

The fuel lines shall be nylon braid reinforced fuel hose with brass fittings. The lines shall be carefully routed along the inside of the frame rails. All fuel lines are covered in high temperature rated split plastic loom. Single suction and return fuel lines shall be provided.

The fuel tank shall be mounted in a saddle with a barrier between the tank and the saddle. The bottom of the fuel tank shall contain a 1/2" drain plug.

FUEL FILL

The fuel tank shall be equipped with a 2-1/4" filler neck assembly with a 3/4" vent located on the driver's side of the truck. A fuel fill cap attached with a lanyard shall be provided.

FUEL COOLER

Installed on the apparatus fuel system shall be an Air-To-Liquid aluminum fuel cooler. The fuel cooler shall be located in the lowest module of the cooling system.

DIESEL EXHAUST FLUID TANK

The exhaust system shall include a molded cross linked polyethylene tank. The tank shall have a capacity of 5 usable gallons and shall be mounted on the left side of the chassis frame.

The DEF tank fill neck shall accept only a 19mm dispensing nozzle versus the standard 22mm diesel fuel dispensing nozzle to prevent cross contamination. The DEF tank cap shall be blue in color to further prevent cross contamination.

A placard shall accompany fill location noting DEF specifications.

EXHAUST SHIELD

There shall be a heat deflector over the exhaust where it passes under the right side compartment.

EXHAUST ADAPTER

The exhaust shall terminate to accept a station mounted PlymoVent® exhaust system.

ALTERNATOR

A 420 ampere Prestolite/Leece Neville alternator with serpentine belt shall be provided The alternator shall generate 260 amperes at idle.

A low voltage alarm, audible and visual, shall be provided.

BATTERIES

The battery system shall be a single system consisting of four negative ground, 12 volt Interstate Group 31 MHD batteries, cranking performance of 950 CCA each with total of 3800 amps, 185 minute reserve capacity with 25 ampere draw at 80 degrees Fahrenheit. Each battery shall have 114 plates. Warranty shall be accepted nationwide.

The batteries shall be installed in a vented 304 stainless steel battery box with a removable aluminum cover to protect the batteries from road dirt and moisture. The battery cover shall be secured with four "T" handle rubber hold downs to provide easy access for maintenance and inspection. Stainless steel hardware will be used for installation. The batteries are to be placed on dri-deck and secured with a fiberglass hold down. The batteries shall be wired directly to starter motor and alternator.

The battery cables shall be 3/0 gauge. Battery cable terminals shall be soldering dipped, color-coded and labeled on heat shrink tubing with a color-coded rubber boot protecting the terminals from corrosion.

There shall be a 350-ampere fuse protecting the pump primer and a 250-ampere fuse protecting the electric cab tilt pump and other options as required.

MASTER BATTERY DISCONNECT SWITCH

A master battery disconnect switch shall be installed under the driver's seat. The switch shall be installed on the vertical face of the seat riser so it is visible when the cab door is opened.

BATTERY JUMPER TERMINAL

There shall be one set (two studs) of battery jumper terminals located by the battery box under the cab. The terminals shall have plastic color-coded covers. Each terminal shall be tagged to indicate positive/negative.

BATTERY CHARGING

A Kussmaul Auto Charge 1200 battery system charger shall be provided. The Auto Charge 1200 is a fully automatic battery charger with a very high output for vehicles with a single battery system. A single bar graph display is provided to indicate the state of charge of the battery system. The rated output shall be 40 amps for the vehicle battery system.

A 120 volt Auto Pump air compressor shall also be provided to maintain air within the air brake system.

A miniature air filter that mounts in the output pressure line of the air pump to trap moisture shall be provided. The micron filter element removes contaminants from the air line. A transparent bowl permits easy monitoring of water collected and a manual purge valve allows the operator to conveniently drain the bowl. A Bendix DV2 heated automatic drain valve shall be provided.

SHORELINE

A shoreline connection shall be provided and located on the driver's side of the cab between the front and rear doors.

AUTO-EJECT

A Kussmaul Model 091-55-20-120 super electric auto-eject with weatherproof cover and power interrupt shall be provided.

SHORE POWER

A shore power connection shall be provided with two (2) 110-volt outlets. The location of the outlets shall be determined during the pre-construction conference.

AUTO-EJECT

A Kussmaul Model 091-55-20-120 super electric auto-eject with weatherproof cover and power interrupt shall be provided.

FRONT AXLE

A Meritor™ MFS-20-133A non-driving, front steer axle with a capacity 20,000 pounds shall be provided. The axle shall have a 3.74" dropped I-beam, be 10 bolt hub piloted, and furnished with oil seals.

SUSPENSION (FRONT)

The front suspension shall be a variable rate taper-leaf design, 54" long and 4" wide. Long life, maintenance free, urethane bushed spring shackles shall be utilized. All spring and suspension mounting shall be attached directly to frame with high strength Huck bolts and self-locking round collars. Spring shackles and pins that require grease shall not be acceptable. **NO EXCEPTIONS**.

ENHANCED FRONT SUSPENSION SYSTEM

The front suspension shall have the handling, stability, and ride quality enhanced by the use of a Ride Tech auxiliary spring system and Koni high performance shock absorbers.

This system shall utilize three stage, urethane auxiliary springs, and high performance gas filled shock absorbers to control the deflection of the leaf springs, and dampen vibration normally transmitted to the chassis. This maintenance free system will be custom tuned to the apparatus gross weight rating for maximum performance, while maintaining a soft compliant ride. **NO EXCEPTIONS.**

A (3) three year 36,0000 mile warranty will be provided by the manufacturer.

FRONT TIRES

Front tires shall be Michelin 385/65R22.5, load range J, XZY3 tread, single tubeless type with a GAWR of 20,000 pounds. Wheels shall be disc type, hub piloted, 22.5 x 12.25 10 stud 11.25 bolt circle.

REAR AXLE

The rear axle shall be a Meritor™ RS-30-185 Single reduction drive axle with a capacity of 31,000 lbs. The axles shall be hub piloted, 10 studs, furnished with oil seals.

TOP SPEED

The top speed shall be approximately 60 MPH.

SUSPENSION (REAR)

31,000 LB SPRING

A Reyco model 18308-01 rear spring suspension shall be provided. The rear semi-elliptic springs shall be 37-1/4" x 3 x 10 leaf with trailing arms. The trailing arms allow free movement of the axle from bump loads and deflections while holding the axle in chassis alignment. This suspension shall control axle wrap-up torque caused by accelerating or braking. The trailing arms shall be mounted in maintenance free rubber bushings at both ends. The left arm shall be adjustable in length for maximum accuracy of chassis alignment.

REAR TIRES

Rear tires shall be Michelin 315/80R22.5, load range L, XDY3 Mud and Snow tread, dual tubeless type with a GAWR up to 31,000 pounds. Wheels shall be disc type, hub piloted, 22.5 x 9 10 stud with 11.25" bolt circle.

A set of roller chains shall be supplied with the truck for the rear tires.

TIRE PRESSURE MONITOR

A Real Wheels LED tire pressure sensor shall be provided for each wheel. The pressure sensor shall indicate if a particular tire is not properly inflated. A total of six (6) indicators shall be provided.

WHEELS

The front and rear wheels shall be ALCOA® brand aluminum. DURA-BRIGHT® finish shall be provided on front and outside-rear wheels.

HUB COVERS

Polished stainless steel hub covers shall be provided for the front and rear axle.

LUG NUT CAPS

Chrome plated lug nut caps shall be provided for the front and rear wheels.

FRONT MUD FLAPS

Hard rubber mud flaps shall be provided for front tires.

REAR MUD FLAPS

Hard rubber mud flaps shall be provided for rear tires.

BRAKES, Front

The front axle shall be provided with Meritor #EX225H or equivalent air disc brakes with internal automatic adjustment, sealed synchronized twin pistons and robust sealing of slide pins for environmental protection. The #EX225H air disc brakes shall have 17" rotors and a fully sealed lever mechanism with variable mechanical ratio. A visual indicator of brake wear shall also be provided.

BRAKES, Rear

The rear brakes shall be Meritor S-cam style. They shall be 16.5" x 7" with heavy-duty return springs, and a double anchor pin design. They shall also have quick-change shoes for fast easy brake relining.

AIR BRAKE SYSTEM

The vehicle shall be equipped with air-operated brakes. The system shall meet or exceed the design and performance requirements of current FMVSS-121 and test requirements of current NFPA 1901 standards.

Each wheel shall have a separate brake chamber. A dual treadle valve shall split the braking power between the front and rear systems.

All main brake lines shall be color-coded nylon type protected in high temperature rated split plastic loom. The brake hoses from frame to axle shall have spring guards on both ends to prevent wear and crimping as they move with the suspension. All fittings for brake system plumbing shall be brass.

A Meritor Wabco System Saver 1200 air dryer shall be provided.

The air system shall be provided with a rapid build-up feature, designed to meet current NFPA 1901 requirements. The system shall be designed so the vehicle can be moved within 60 seconds of startup. The quick build up system shall provide sufficient air pressure so that the apparatus has no brake drag and is able to stop under the intended operating conditions following the 60-second buildup time. The vehicle shall not be required to have a separate on-board electrical air compressor or shoreline hookup to meet this requirement.

Four (4) supply tanks shall be provided. One air reservoir shall serve as a wet tank and a minimum of one tank shall be supplied for each the front and rear axles. A Schrader fill valve shall be mounted in the front of the driver's step well.

A spring actuated air release emergency/parking brake shall be provided on the rear axle. One (1) parking brake control shall be provided and located on the engine hood next to the transmission shifter within easy reach of the driver. The parking brake shall automatically apply at 35 ±10 PSI reservoir pressure. A Meritor WABCO IR-2 Inversion Relay Valve, supplied by both the Primary and Secondary air systems, shall be used to activate the parking brake and to provide parking brake modulation in the event of a primary air system failure.

Accessories plumbed from the air system shall go through a pressure protection valve and to a manifold so that if accessories fail they shall not interfere with the air brake system.

AUTOMATIC HEATED MOISTURE EJECTORS

Each air tank in the chassis braking system shall consist of a heated automatic moisture ejector to assist in keeping the air tanks and air lines free of debris and moisture. A manual pull cable shall be incorporated.

AIR INLET

An air system inlet/fill connection shall be provided. The inlet shall be connected to the air brake to allow constant air feed. The location of the inlet shall be determined during the pre-construction conference.

AUTO-EJECT

A Kussmaul Model 091-28 auto-eject with female coupling shall be provided.

AIR BRAKING ABS SYSTEM

A Wabco ABS system shall be provided to improve vehicle stability and control by reducing wheel lock-up during braking. This braking system shall be fitted to axles

and all electrical connections shall be environmentally sealed from water and weather and be vibration resistant.

The system shall constantly monitor wheel behavior during braking. Sensors on each wheel transmit wheel speed data to an electronic processor, which shall sense approaching wheel lock and instantly modulate brake pressure up to 5 times per second to prevent wheel lock-up. Each wheel shall be individually controlled. To improve field performance, the system shall be equipped with a dual circuit design. The system circuits shall be configured in a diagonal pattern. Should a malfunction occur, that circuit shall revert to normal braking action. A warning light at the driver's instrument panel shall indicate malfunction to the operator.

The system shall consist of a sensor clip, sensor, electronic control unit and solenoid control valve. The sensor clip shall hold the sensor in close proximity to the tooth wheel. An inductive sensor consisting of a permanent magnet with a round pole pin and coil shall produce an alternating current with a frequency proportional to wheel speed. The unit shall be sealed, corrosion-resistant and protected from electro-magnetic interference. The electronic control unit shall monitor the speed of each wheel sensor and a microcomputer shall evaluate wheel slip in milliseconds.

AUTOMATIC TIRE CHAIN SYSTEM

The apparatus shall be equipped with an On-Spot brand Automatic Tire Chain System.

There will be one driver's side and one passenger's side chain unit.

A continuous duty solenoid shall be provided and activated by the dashboard switch, which opens and allows compressed air to flow to the chain units. Compressed air will be delivered to the solenoid from the vehicle's air tank. The solenoid shall be mounted on the frame rail or crossmember in close proximity of the chain units. This air/electric solenoid shall be 12-volts and draw no more than 1 ampere of current. Electrical wire shall be in accordance with NFPA 1901.

A 12-volt dashboard switch shall be provided so that the operator may engage the chains from the driver's seat. The switch shall be lighted to indicate when the chains are engaged. The switch shall come complete with a switch guard to avoid accidental engagement of the automatic chains. The switch guard shall be properly labeled. A dashboard sticker with operating instructions shall be provided.

MISCELLANEOUS CHASSIS EQUIPMENT

Fluid capacity plate affixed below driver's seat.

Chassis filter part number plate affixed below driver's seat.

Maximum rated tire speed plaque near driver.

Tire pressure label near each wheel location.

Cab occupancy capacity label affixed next to transmission shifter.

Do not wear helmet while riding plaque for each seating position.

NFPA compliant seat belt and standing warning plates provided.

ALUMINUM CAB

The cab shall be a full tilt 6-person cab designed specifically for the fire service and manufactured by the chassis builder. Apparatus cabs that are not manufactured by the apparatus manufacturer shall not be acceptable.

CAB DESIGN

The apparatus chassis shall be of an engine forward, fully enclosed tilt cab design. There shall be four (4) side entry doors.

The cab shall be of a fully open design with no divider wall or window separating the front and rear cab sections. The cab shall be designed in a manner that allows for the optimum forward facing vision for crew. Cab designs that utilize roof mounted air conditioning units, are not desired.

The cab shall be constructed of high strength 5052H32 aluminum plate welded to 6061-T6 extruded aluminum framing.

The cab roof shall utilize 5" x 5" honeycomb re-enforced 6061 T6 aluminum extrusion, with fully radiused outer corner rails with integral drip channel and 6061 T6 ¾" x 2" x 3/16" aluminum box tubing type cross brace supports. Structures that do not include an integral drip channel will not be accepted. The box tubing type cross brace supports shall be installed in a curved fashion beginning from the midline of the apparatus cab and curving toward the exterior corner rails. This curvature will allow for increased strength in the event of a roll over while not allowing for rainwater buildup on the apparatus cab roof.

The cab sides shall be constructed from 1 ½" x 3" x 3/16" 6061 T6 extruded door pillars and posts that provide a finished door opening, extruded and formed wheel

well openings supports, formed aluminum wheel well liners and box tubing type support braces.

The cab floor and rear cab wall shall utilize 1 ¾" x 4" x 3/16" 6061 T6 extruded box tubing type framing and support bracing.

The framework shall be of a welded construction that fully unitizes the structural frame of the cab.

The structural extrusion framework shall be overlaid with interlocked aluminum alloy sheet metal panels to form the exterior skin of the cab. The cab sides shall be constructed of 3/16" thick 5052H32 aluminum plate that slides into an integral channel of the extrusion framework. The plate is then skip welded into that channel to allow for tolerable flex while the apparatus travels down the roadway. Cab designs that utilize 1/8" thick aluminum for the cab sides shall not be acceptable.

The structural extrusion framework shall support and distribute the forces and stresses imposed by the chassis and cab loads and shall not rely on the sheet metal skin for any structural integrity.

The cab face extrusion framework shall be overlaid with 1/8" thick 5052H32 aluminum plate to allow for an aesthetically pleasing radiused cab face.

CAB SUB-FRAME

The cab shall be mounted to a 4" x 4" x 3/8" steel box tube sub-frame, and shall be isolated from the chassis, through the use of no less than six (6) elastomeric bushings. This substructure shall be completely independent of the apparatus cab. The sub frame shall be painted to match the primary chassis color.

The sub-frame shall be mounted to the chassis through the use of lubricated Kaiser Bushings for the front pivot point, and two (2) hydraulically activated cab latches, to secure the rear.

Cab mounting that does not include a sub-frame shall not be considered. **NO EXCEPTIONS.**

CAB DIMENSIONS

The cab shall be designed to satisfy the following minimum width and length dimensions:

Cab Width (excluding mirrors) 98"

Cab Length (from C/L of front axle)

To front of cab (excluding bumper) 68"

To rear of cab 62"

Total Cab Length (excluding bumper) 130"

ROOF DESIGN

The cab shall be of a flat roof design with side drip rails and shall satisfy the following **minimum** height dimensions:

Cab Dimensions Interior
Front 59"
Rear 55"

Cab Dimensions Exterior
Front 65"
Rear 65"

FENDER CROWNS

Polished stainless steel front axle fenderettes with full depth radiused wheel well liners shall be provided.

CAB INSULATION

The exterior walls, doors, and ceiling of the cab shall be insulated from the heat and cold, and to further reduce noise levels inside the cab. The cab interior sound levels shall not exceed 90 decibels at 45 mph in all cab seat positions. **NO EXCEPTIONS**

EXTERIOR GLASS

The cab windshield shall be of a two piece curved design utilizing tinted, laminated, automotive approved safety glass. The window shall be held in place by an extruded rubber molding. The cab shall be finished painted prior to the window installation.

SUN VISORS

The sun visors shall be made of dark smoke colored transparent polycarbonate. There shall be a visor located at both the driver and officer positions, recessed in a molded form for a flush finish.

CAB STEPS

The lower cab steps shall be no more than 22" from the ground. An intermediate step shall be provided, mid way between the lower cab step, and the cab floor.

The intermediate step shall be slightly inset to provide for safer ingress and egress. All steps shall be covered with material that meets or exceeds the NFPA requirements for stepping surfaces.

STEP LIGHTS

A white LED strip light shall illuminate each interior cab step. These lights shall illuminate whenever the battery switch is on and the cab door is opened.

CAB STRUCTURAL INTEGRITY

The cab of the apparatus shall be designed and so attached to the vehicle as to eliminate, to the greatest possible extent, the risk of injury to the occupants in the event of an accident.

The apparatus cab shall be tested to specific load and impact tests with regard to the protection of occupants of a commercial vehicle.

A test shall be conducted to evaluate the frontal impact strength of the apparatus cab to conform to the test J2420 and the "United Nations Regulation 29, Annex 3, paragraph 4, (Test A). A second test shall be conducted to evaluate the roof strength of the apparatus cab to conform to the Society Of Automotive Engineers (SAE) SAE J2422/SAE J2420 and "United Nations Regulation 29, Annex 3, paragraph 5, (Test B) and SAE J2420. The evaluation shall consist of the requirements imposed by ECE Regulation 29, Paragraph 5.

The test shall be conducted by a certified independent third party testing institution.

A letter stating successful completion of the above test on the brand of cab being supplied shall be included in the bid. There shall be **"no exception"** to this requirement.

SEAT BELT TESTING

The seat belt anchorage system shall be tested to meet FMVSS 207 Section 4.2a and FMVSS 210 section 4.2. Testing shall be conducted by an independent third party product evaluation company.

A copy of the certification letter shall be supplied with the bid documents.

CAB TILT SYSTEM

An electrically powered hydraulic cab tilt system shall be provided, and shall lift the cab to an angle of 45 degrees, exposing the engine and accessories for fluid checks and service work. The system shall be interlocked to only operate when the parking brake is set.

The lift system shall be comprised of two (2) hydraulic lift cylinders, an electrically driven hydraulic pump, and a control switch. The hydraulic pump shall be located on the exterior of the frame rail on the driver's side of the chassis that can be easily accessible when the cab is tilted. A mechanical locking system consisting of an air operated actuator and a heavy radiused wall 3" x 3" aluminum extrusion will be provided to ensure the cab remains in the raised position in the event of a hydraulic failure. Additionally, each of the hydraulic lift cylinders shall incorporate a check valve, and velocity fuses that will activate should a sudden drop in pressure by detected. The cab tilt controls shall be interlocked to the parking brake to ensure the cab will not move, unless the parking brake is set. The cab tilt controls will consist of a momentary raise/lower switch and a two position cab safety lock switch.

The hydraulic lift cylinders will be connected to a steel cab sub-frame, and not directly to the cab. NO EXCEPTIONS

MANUAL CAB LIFT

There shall be a manually operated hydraulic pump for tilting the cab in case the main pump should fail. Access to the pump shall be located under the left corner of the front bumper.

BARRIER STYLE CAB DOORS

Barrier style cab doors shall be provided. The lower part of the door shall be removed to expose the cab entry step well. The step well shall be lined with aluminum treadplate.

The cab doorframes shall be constructed from 6061 T6 aluminum extrusions fitted with a 5052 H32 aluminum sheet metal skin and shall be equipped with dual weather

seals. The outside cab door window opening shall be framed by a black anodized aluminum trim, to provide a clean appearance. The cab doors shall be equipped with heavy-duty door latching hardware, which complies with FMVSS 206. The door latch mechanism shall utilize control cable linkage for positive operation. A rubber coated nylon web doorstop shall be provided.

The doors shall be lap type with a 10 gauge full-length stainless steel flange and 3/8" diameter hinge pin and shall be fully adjustable.

All openings in the cab shall be grommeted or equipped with rubber boots to seal the cab from extraneous noise and moisture.

The cab doors shall be designed to satisfy the following minimum opening and step area dimensions:

Door Opening:

Front	36.5" x 73"
Rear	36.5" x 73"

POWER WINDOWS

All four cab entry doors shall have power windows. Each door shall be individually operated and the driver's position shall have master control over all windows. All four windows shall roll down completely.

SIDE WINDOWS

Fixed position side window shall be provided on each side of the cab between the forward cab area and the crew cab area. The widows shall be approximately 20.5" high x 16.50" wide to provide maximum visibility. The side windows shall be held in place by an extruded rubber molding with a chrome plated decorative locking bead.

WINDSHIELD WIPERS

Two (2) black anodized finish two speed synchronized electric windshield wiper system. Dual motors with positive parking. System includes large dual arm wipers with built in washer system. One (1) master control works the wiper, washer and intermittent wipe features. Washer bottle is a remote fill with a 4 quart capacity. Washer fill is located just inside of officer cab door.

CAB HANDRAILS

There shall be a 24" long, handrail provided and installed, at each cab entrance. The handrails shall be constructed of type 304 stainless steel 1.25 inch diameter tubing with bright finish and knurled gripping surface. Mounting flanges shall be constructed from 7 gauge, .180 thick, stainless sheet. Each grab rail shall have 90 degree returns to flanges. The ends of grab rail shall pass through the flanges and be welded to form one structural unit. The handrails shall be mounted using 1.25" SS Hex bolts, with a barrier rubber gasket at each flange.

Sufficient space shall allow for a gloved hand to firmly grip the rail.

There shall be two (2) rubber coated grab handles provided and mounted on the interior of the cab, one each side, on the windshield post for ingress assistance. The handrail on the driver's side shall be approximately 11" long and the handrail on the officer's side shall be approximately 18" long.

COAT HOOKS FOR GRAB HANDLES

There shall be a coat hook installed at the top of each exterior cab handrail, for hanging of coats, turnout gear, etc.

CAB DOOR HANDRAILS

Two (2) 1.25" diameter knurled stainless steel handrails shall be provided on the inside of the rear crew doors just above the windowsill.

MIRRORS

Two (2) Lang Mekra 300 Series smooth chrome plated Aero style main and convex mirrors shall be installed on each side of the vehicle. The main mirror shall be 4-way remote adjustable with heat, 7" x 16" 2nd surface chromed flat glass. The convex shall be 6" x 8" 2nd surface chromed 400 mm radius glass. Each mirror housing assembly shall be constructed of lightweight textured chrome ABS with on truck glass and housing back cover replacement. In the event the mirror breaks the glass shall be replaceable in (3) minutes or less. The glass shall include a safety adhesive backing to keep broken glass in place. The mirror assembly shall be supported by a "C" loop bracket constructed of polished stainless steel tube utilizing two point mounting reducing vibration of mirror glass during normal vehicle operation. The lower section of the holder shall include a spring loaded single detent position 20 degrees forward with easy return to operating position without refocusing.

GRILLE

The front of the cab shall be equipped with a polished stainless steel grille with sufficient area to allow proper airflow into the cooling system and engine compartment. Plastic chrome plated grilles shall not be acceptable.

PAINTED STEEL BUMPER

There shall be a 12" high painted formed steel wrap-around (45 degree) bumper provided at the front of the apparatus. The bumper shall be mounted to a reinforcement plate constructed of 1/4" x 12" x 70" carbon steel. The frame rail extension shall be a reinforced four-sided boxed frame rail for superior safety protection. A gravel shield shall be provided, constructed of .188" aluminum diamond plate. The bumper extension shall be approximately 18".

The bumper shall be painted gloss black.

BUMPER TROUGH LIP

The bumper trough shall have a 1" lip around the top of the trough to assist in containing components in the trough as well as reducing allowance of moisture and debris into the trough.

STORAGE WELL COMPARTMENT

There shall be a hose well compartment located in the center of the front bumper. The compartment shall run the full width of the bumper and measure approximately 75" wide x 10" long x 5" deep at the ends and 12" deep in the center. The compartment shall be constructed of .125" smooth aluminum plate.

The bumper compartment shall be capable of storing up to 150 feet of 1-3/4" Double Jacket attack hose.

DIAMOND PLATE BUMPER LID

There shall be a 1/8" diamond plate cover with latches provided for the front bumper trough. The cover shall have a 2" rise to accommodate the storage well requirements.

AIR HORNS

Two (2) Grover 1510 round, chrome plated, air horns shall provided.

LANYARD CONTROL FOR AIR HORNS

The air horns shall be activated by a split "Y" lanyard in cab ceiling.

ELECTRONIC SIREN

One (1) Whelen 295SLSA1 electronic siren shall be installed at the cab instrument panel complete with noise canceling microphone. The remote control head shall be flush mounted in a location specified by the fire department.

SIREN SPEAKER

A Whelen model SA122FMP weatherproof siren speaker shall be provided and mounted behind the perforated front bumper.

FEDERAL Q2B SIREN

There shall be a Federal Q2B-NN siren installed in the center of the cab grille. The siren shall be securely mounted and activated by means of a solenoid and shall include a brake. The brake switch will be a "3-position"/combination "On/Off/Brake" switch.

FOOT SWITCH, DRIVER'S SIDE, FOR MECH SIREN

A foot switch for the mechanical siren shall be provided on the driver's side.

FOOT SWITCH, OFFICER'S SIDE, FOR MECH SIREN

A foot switch for the mechanical siren shall be provided on the officer's side.

LIGHTING CAB EXTERIOR

Exterior lighting and reflectors shall meet or exceed Federal Motor Vehicle Safety Standards and National Fire Protection Association requirements in effect at this time.

HALOGEN HEADLIGHTS

There shall be dual beam halogen rectangular headlights in custom housings on each side of the front of the cab.

Headlight alignment shall conform to SAE J599 AUG. 1997

- DOT Approved FMVSS 108
- SAE J96 ECE Reg. 112
- Sealed to IP67

FRONT TURN SIGNALS

There shall be two Whelen M6 Series LED amber turn signal lights mounted one each side in the front of the headlight housing and one mounted on each side of the warning light housing.

CORNERING LIGHTS

Two (2) Whelen Model M6 LED cornering lights shall be mounted on the sides of the bumper, one each side. The lights shall come on steady, with their coordinating turn signal.

ALTERNATING HEAD LAMP

The headlights shall have an alternating flash feature for emergency response use.

CAB REAR WALL COVERING

The rear outside wall of the cab shall be covered with 1/8" aluminum diamond plate.

CAB INTERIOR

The metal surfaces of the cab interior shall be coated and sealed with Scorpion heavy duty, gray polyurethane blended coating. The textured coating shall provide paramount durability and wear resistance against foreign objects and normal wear and tear.

The front and rear headliners, as well as the rear cab wall, shall be finished in Gray-Black Durawear covered padded panels.

INTERIOR DOOR PANELS

The interior of the cab entry doors shall be finished in gray Durawear up to the door window sills. The lower portion of the doors shall have a 304 brushed stainless steel scuff plate, contoured to the door.

REFLECTIVE MATERIAL

The lower portion of the door panels shall include a total of 245 square inches of reflective material on each door, exceeding the NFPA requirement of 96 square inches. The layout shall be opposing "chevron" stripes using reflective scotchlite material. The reflective decal shall be plainly visible to oncoming traffic when the doors are in the open position.

CAB FLOOR COVERING

The cab interior floor shall be covered with a 5/16" thick, gray rubberized material to provide a rugged but cosmetically pleasing stepping surface throughout the cab. The floor covering shall provide superior durability and resistance against foreign objects as well as normal wear and tear.

ENGINE ENCLOSURE

An integral, formed aluminum and composite engine enclosure shall be provided. The engine enclosure shall be contoured and blended in an aesthetically pleasing manner with the interior dash and flooring of the cab. The enclosure shall be kept as low as possible, to maximize space and increase crew comfort.

The enclosure shall be constructed from 5052 H2 aluminum plate and GRP composite materials, providing high strength, low weight, and superior heat and sound deadening qualities.

Additionally, the underside of the engine enclosure shall be coated in with a ceramic spray on insulation and sound control. This coating is an environmentally-friendly coating that is applied seamlessly and rapidly while providing superior thermal insulation and protection against vibration and noise, and will prevent future corrosion from forming by sealing the substrate. NO EXCEPTIONS

ENGINE ENCLOSURE COVERING

The top of the engine enclosure shall be covered with Scorpion heavy duty, black polyurethane blended coating. The textured coating shall provide paramount durability and wear resistance against foreign objects and normal wear and tear as well as sound deadening and insulation. The rubberized cab floor covering shall extend up the lower exterior sides of the engine enclosure to aid in sound deadening and heat resistance.

CENTER CONSOLE

There shall be a storage console installed on the engine enclosure between the driver and officer. The console shall be constructred from smooth aluminum and shall be coated with the same finish as the engine enclosure. The console shall measure approximately 23" long X 11.375" wide X 8.125" high. The console shall have a 13" long storage area in the center that shall be divided into five (5) separate areas with four (4) fixed vertical dividers. The dividers shall be spaced 2.125" apart for map book storage. A Velcro strap shall be installed front to rear to secure the map books. Each outboard area of the console shall have one (1) stainless steel cup holder and one (1) approximately 5.5" long X 4.75" wide X 3.5" high open storage area.

ENGINE HOOD LIGHTS

Two (2) LED work lights shall be installed in the engine enclosure with individual switches located on the base of the lights.

WORK SURFACE

There shall be a flat work surface in front of the officer's seat.

PAC TOOL BOARDS

There shall be PAC Tool boards mounted on the rear interior wall of the cab. The PAC boards will be full height on both sides of the forward facing seats.

INSTRUMENT PANEL

The main dash shroud, which covers the area directly in front of the driver from the doorpost to the engine hood, shall be custom molded and covered with a non-glare black vinyl. The dash shall be a one-piece hinged panel that tilts outward for easy access to service the internal components. The gauge panel shall be constructed of durable aesthetically pleasing light gray polymer material, placed over a heavy duty steel backing plate, for added strength and durability.

The gauges shall be Beede Instruments, NexSys Link gauges with built-in self-diagnostics and red warning lights to alert the driver of any problems. All gauges and controls shall be backlit for night vision and identified for function. All main gauges and warning lights shall be visible to the driver through the steering wheel.

RADIO ANTENNA MOUNT

There shall be three (2) standard 1.125", 18 thread antenna-mounting base(s) installed on the cab roof, aft of the lightbar, evenly spaced across the roof for high efficiency, low loss, shielded coaxial cable(s) routed to the radio mounting area. A weatherproof cap shall be installed on the mount.

Radio Mounting Location

There shall be a mounting spot for (2) DIN size radios in the dash easily reachable by the driver and passenger. They shall have a minimum clearance depth of 10" for each. The radio antenna cables should terminate in this location. Also there shall be (2) 50 amp 10 gauge red power wire hard wired to constant clean 12v power source. There shall also be (2) 5 amp 14 gauge power wires connected to the ignition power in this location. And then (2) 10 gauge black chassis ground wires at this location.

MASTER BATTERY & IGNITION SWITCH

The vehicle shall be equipped with a keyless ignition, with a three (3)-position Master Battery rocker switch, "Off/ACC/On" and a two (2)-position Engine Start rocker switch, "Off/Start".

DIESEL PARTICULATE FILTER CONTROLS

There shall be two (2) controls for the diesel particulate filter. One control shall be for regeneration and one control shall be to inhibit engine regeneration. These shall be located below the steering wheel in the kick panel.

INSTRUMENTATION & CONTROLS

Instrumentation on dash panel in front of the driver:

1. Tachometer/hourmeter with high exhaust system regeneration temperature, and instrument malfunction indicators
2. Speedometer/odometer with built in turn signal, high beam, and re-settable trip odometer
3. Voltmeter
4. Diesel fuel gauge
5. DEF (Diesel Exhaust Fluid) gauge
6. Engine oil pressure
7. Transmission temperature
8. Engine temperature
9. Primary air pressure
10. Secondary air pressure

Indicators and warning lights in front of the driver:

1. Parking brake engaged
2. Low air with buzzer
3. Antilock brake warning
4. Check transmission
5. Transmission temperature
6. Upper power indicator
7. Seat belt
8. Engine temperature
9. Low oil indicator
10. Low voltage indicator
11. Air filter restriction light
12. Low coolant indicator
13. High idle indicator
14. Power on indicator
15. Check engine
16. Stop engine
17. Check engine MIL lamp

18. DPF indicator
19. High exhaust temperature
20. Wait to start

Other indicator and warning lights (if applicable):

1. Differential locked
2. PTO (s) engaged
3. Auto-slip response
4. Retarder engaged
5. Retarder temperature
6. ESC indicator

Controls located on main dash panel in front of the driver:

1. Master power disconnect with ignition switch
2. Engine start switch
3. Headlight switch
4. Windshield wiper/washer switch
5. Differential lock switch (if applicable)
6. Dimmer switch for backlighting

Controls included in steering column:

1. Horn button
2. Turn signal switch
3. Hi-beam low-beam switch
4. 4-way flasher switch
5. Tilt-telescopic steering wheel controls

CENTER CONTROL CONSOLE

There shall be an ergonomically designed center control console. The console shall be constructed of 1/8" smooth aluminum and shall be mounted on the engine hood between the driver and officer. The console shall have a durable coating to match the color of the engine hood covering and shall feature surfaces on each side that are contoured to face the driver and the officer for easy viewing and accessibility. The switches and other customer specified electrical items shall be mounted in removable 1/8" smooth aluminum panels with a black wrinkle finish. The console shall have an aluminum lift-up lid with quick release latch. The lid shall be held in the open position with a gas strut to allow for easy access and serviceability.

Controls located in the console conveniently accessible to the driver:

1. Transmission shifter
2. Pump shift control with OK TO PUMP and PUMP ENGAGED lights
3. Remote mirror control

4. Illuminated rocker switches to control high idle, Jacob's brake, siren/horn, siren brake, master emergency, and other customer specified components
5. 12V power point (if applicable)

Controls located in the console conveniently accessible to the driver and the officer (center):

1. Parking brake control with a guard to prevent accidental engagement

Controls located in the console conveniently accessible to the officer:

1. Illuminated rocker switches to control customer specified components that are easily reachable to the officer and do not allow for compromise of the driver's view, and eliminate the need for foot switches
2. Surface to recess siren head, radio head, or other desired items as space permits
3. 12V power point (if applicable)

Driving compartment warning labels shall include:

1. HEIGHT OF VEHICLE
2. OCCUPANTS MUST BE SEATED AND BELTED WHEN APPARATUS IS IN MOTION
3. DO NOT USE AUXILIARY BRAKING SYSTEMS ON WET OR SLIPPERY ROADS
4. EXIT WARNINGS

Additional labels included:

1. COMPUTER CODE SWITCH
2. ABS CODE SWITCH
3. FLUID DATA TAG
4. CHASSIS DATA TAG

OVERHEAD CONTROL CONSOLE

An ergonomically designed overhead console shall be provided above the driver and officer, running the full width of the cab. The overhead console shall be constructed from 1/8" aluminum plate and shall be painted with a durable finish to match the inside of the cab. There shall be seven (7) removable 1/8" smooth aluminum plates with a black wrinkle finish to house switches and other electrical items.

Directly above the driver there shall be two (2) panels with no cutouts, unless otherwise specified by the customer.

There shall be a panel located to the right of the driver that shall be designated for defroster, heat, and air conditioning controls (if specified).

The center overhead panel shall be designated for up to seven (7) door ajar indicators. Upon releasing the apparatus parking brake, one or more of these lights shall automatically illuminate (flash) when any of the following conditions occur that may cause damage if the apparatus is moved: cab or compartment door is open; ladder or equipment rack is not stowed; stabilizer system deployed; any other device has not been properly stowed.

There shall be a panel to the left of the officer as well as two (2) directly above the officer. These panels shall have no cutouts, unless otherwise specified by the customer.

BODY DOOR AJAR LIGHT

An Whelen TO series 2 amber LED light shall be installed in the cab near the driver. The light shall illuminate when the parking brake is released and any cab or body door is open or any other item on the apparatus is not properly stowed that may cause damage.

DOOR AJAR LIGHT

An Whelen TO series 2 red LED shall be installed in the cab near the driver. The light shall illuminate when the parking brake is released and any cab or body door is open or any other item on the apparatus is not properly stowed that may cause damage.

ENGINE WARNING SYSTEM

An engine warning system shall be provided to monitor engine conditions such as low oil pressure, high engine temperature and low coolant level. Warning indication shall include a STOP ENGINE (red) light with audible buzzer activation and a CHECK ENGINE (amber) light

Note: (Some engine configurations may also include a fluid warning light.)

There shall be a master information light bar with 24 lights located across the center of the dash panel that covers up to 24 functions. These are defined under Indicators and Warning Lights above.

CHASSIS WIRING

All chassis wiring shall have XL high temperature crosslink insulation. All wiring shall be color-coded, and the function and number stamped at 3" intervals on each wire. All wiring shall be covered with high temperature rated split loom for easy access to wires when trouble shooting. All electrical connectors and main connectors throughout the chassis shall be treated to prevent corrosion.

MASTER ELECTRICAL PANEL

The main chassis breaker panel shall be wired through the master disconnect solenoid and controlled by the three-position ignition rocker switch. The breaker panel shall be located in front of the officer on the interior firewall and shall be protected by a removable aluminum cover. The cover shall have an aluminum notebook holder on the exterior face accessible to the officer. The cover shall be painted with a durable finish to match the interior of the cab and shall be secured with two (2) thumb screws.

The breaker panel shall include up to 22 ground switched relays with circuit breaker protection. An integrated electrical sub-panel shall be provided and interfaced to the body and chassis through an engineered wire harness system.

Twelve (12) 20-ampere relays and one (1) 70-ampere relay shall be provided for cab light bar and other electrical items. If the option for a mechanical siren has been selected two (2) additional relays shall be provided.

Up to two (2) additional relay boards with circuit breaker protection shall be provided for additional loads as required. Each board shall contain four (4) relays. The relay boards shall be configured to trip with input from switch of positive-negative or load manager by moving the connector on the board (no tools required).

All relay boards shall be equipped with a power-on indicator light (red), input indicator light (green) and power output indicator light (red).

Up to twenty-three (23) additional automatic reset circuit breakers for non-switched loads that are remotely switched (ie: heater fans, hood lights, etc.) shall be provided.

All relays and circuit breakers on the relay boards shall be pull-out/push-in replaceable.

All circuit breakers on the relay boards shall be 20 ampere automatic reset which can be doubled or tripled for 40 or 60-ampere capacity.

The system shall utilize Deutch DRC weather resistant connectors at the breaker panel, toe board and main dash connections.

All internal wire end terminals, including locking connectors, shall be mechanically affixed to the wire ends by matching terminal crimping presses to assure the highest quality terminations.

All internal splices shall be ultrasonically welded connections and all internal wiring shall be high temperature GXL type wire that is protected by wiring duct wherever possible.

All switches shall be ground controlled; no power going through any rocker switch.

Any switch controlling a relay in the breaker panel shall be capable of being set to function only when the parking brake is set. All relays shall be tagged with the function that the relay is controlling.

PUMP SHIFT MODULE

A pump shift module with indicating lights shall be located within easy reach of the driver. A gear lockup shall be provided to hold the transmission in direct drive for pump operation.

LOAD MANAGER

Load manager shall have the ability to sequence loads on and off. It shall also be able to shed 8 loads when the vehicle is stationary, starting at 12.7 volts lowest priority load to be shed, then respectively at 12.6, 12.4, 12.2, 12.0, 11.8, 11.4 and 11.0 volts DC. Any load that has been shed shall be off for a minimum of five minutes, and then if voltage has rebounded above shed voltage, the shed load shall automatically come on. There shall also be an indicator panel along side the rocker switches, which indicate power is on, battery warning and fast idle. Battery warning indicator shall flash at a rate proportional to the voltage discharge rate.

AUTOMATIC HIGH IDLE ACTIVATION

The load management system shall be capable of activating the apparatus high idle system when the system voltage drops below 12.3 volts DC. The system shall raise engine speed for a minimum of five minutes until voltage exceeds 13.0 volt DC. The load management system shall activate the high idle feature before any devices are automatically shed OFF. The high idle function request from the load management device shall function only if the appropriate interlocks are present; that is, control of

the high idle system is monitored and shall be superseded by the state of the interlock control module. The automatic high idle system shall be deactivated whenever the brake pedal is pressed, and shall remain inactive for two minutes thereafter to allow an operator to override the high idle function and return the engine to idle before PTO engagement.

HIGH IDLE

The engine shall have a "high idle" switch on the dash that shall maintain an engine RPM of 1,000. The switch shall be installed at the cab instrument panel for activation/deactivation. The "high idle" mode shall become operational only when the parking brake is on and the truck transmission is in neutral.

AUXILIARY POWER POINTS

Two (2) 12-volt 20-ampere auxiliary lighter socket type plug-ins, shall be provided in the cab, one near the driver and one near the officer.

CAB ACCESSORY FUSE PANEL

A fuse panel shall be located underneath the rear facing seat on the officer's side. The fuse panel shall consist of six (6) battery hot and six (6) ignition switch circuits. Each circuit shall be capable of 10-ampere 12-volt power and total output of 50-amps. The fuse panel shall be capable of powering accessories such as hand held spotlights, radio chargers, hand lantern chargers and other miscellaneous 12-volt electrical components.

POWER GROUND STUDS

There shall be a minimum of four (4) threaded power studs provided in the chassis electrical compartment to accommodate the future installation of two-way radios. The studs shall be wired as follows:

One (1) 12-volt 40-amp controlled by the battery switch

One (1) 12-volt 100-amp ground

One (1) 12-volt 60-amp controlled by the ignition switch

One (1) 12-volt 60-amp, direct to the battery

VEHICLE DATA RECORDER

An Akron / Weldon vehicle data recorder as required by the 2009 edition of NFPA 1901 shall be installed. Vehicle data shall be sampled at the rate of 1 second per 48 hours, and 1 minute per 100 engine hours.

Free software is available to allow the fire department to collect the data as needed.

LIGHTING CAB INTERIOR

Interior lighting shall be provided inside the front of the cab for passenger safety. Three (3) ceiling mounted combination red/clear LED dome lights with a push button on/off switch in the light lens. One light shall be located over each the officer and driver's position. The lights shall also activate from the open door switch located in each cab doorjamb.

LIGHTING CREW CAB INTERIOR

Interior lighting shall be provided inside the crew cab for passenger safety. Three (3) ceiling mounted combination red/clear LED dome lights with a push button on/off switch in the light lens shall be provided. The lights shall also activate from the open door switch located in each cab doorjamb.

MAP LIGHTS

Two (2) Sunnex 20" "goose neck" LED map lights shall be provided, one on the driver's side and one on the officer's side of the cab dash.

HAND HELD SPOTLIGHT

One Optronics Blue Eye Model KB-4003, 400,000-candle power hand-held spotlight shall be provided, installed at officer's side of cab.

HEATER/DEFROSTER/AIR CONDITIONER

There shall be a minimum 65,000 cool BTU and 65,000 heat BTU single unit, heater/air conditioner mounted over the engine cover. The unit shall be mounted in center of the cab on the engine hood/enclosure. Unit shall have a shutoff valve at the right side of the frame, next to the engine. Airflow of the heater/air conditioner shall be a minimum 1200 CFM. To achieve maximum cooling, a TM-21 Compressor (10 cu. in.) will be used.

The defroster/heater shall be a minimum of 35,000 BTU and shall be a separate unit mounted over the windshield. There shall be eight (8) louvers/diffusers to direct to windshield and door glass. Airflow of the defroster/heater shall be a minimum 350 CFM. The unit shall be painted Zolatone greystone to match the cab ceiling.

The condenser shall be roof mounted and have 65,000 BTU rating. The unit shall include three fan motors. Airflow of the condenser shall be a minimum 2250 CFM. (This roof-mounted condenser shall work at full rated capacity at an idle with no engine heat problems.)

HEATER/DEFROSTER/AIR CONDITIONING CONTROLS

The heater/defroster/air conditioning shall be located in the overhead console in the center of the apparatus cab within reach of the driver and officer. The controls shall be illuminated for easy locating in dark conditions. The controls shall be located in such a way that the driver will not be forced to turn away from the road to make climate control adjustments. Control of all heater/defroster/air conditioning functions for the entire apparatus cab shall be achieved through these controls.

DEFROSTER DIFFUSER

A molded diffuser made of durable ABS plastic ductwork system shall be provided. It shall be form fitted and shall attach to the cab's overhead defroster unit to provide temperature controlled air to the windshields. Air flow of up to 280 cfm is balanced and directed across the entire windshield for optimum defrosting capability in all types of weather.

TOOL MOUNTING PLATE

There shall be a 3/16" smooth aluminum plate installed on top of the heat/ air conditioning unit for use in mounting of equipment. The plate shall measure approximately 25" wide x 19.5" long and shall be spaced up 1". The mounting plate shall feature beveled edges on the front and rear for a finished appearance. The plate shall be coated with the same finish as the heat/air conditioning unit and shall be secured with screws for easy replacement.

DRIVER'S SEAT

An H.O. Bostrom Sierra high back seat with air suspension shall be provided for the driver. The seat shall be equipped with a red 3-point shoulder harness with lap belt. The seat shall have fore/aft adjustment and shall be upholstered with heavy duty Durawear material.

HELMET STORAGE

The helmet for the above seat shall be stored in a compartment. A placard shall be provided visible to the riding position warning that injury may occur if helmets are worn while seated.

OFFICER'S SEAT

An H.O. Bostrom Tanker 450 ABTS SCBA seat shall be provided for the officer. The seat back shall have a SCBA cavity and auto-pivot-and-return padded headrest. The seat shall be equipped with a red 3-point shoulder harness with lap belt and an automatic retractor built into the seat assembly. The seat shall be upholstered with heavy duty Durawear material.

UNDER SEAT STORAGE COMPARTMENT

There shall be a storage area under the officer's seat, accessible from the front through a hinged door with Southco C5 compression lever latch. The door shall be shall be painted with a durable finish to match the inside of the cab and shall be vertically hinged near the engine enclosure.

The storage area shall be approximately 19.5" wide x 14.375" high x 21.75" deep. The lower rear portion of the compartment shall be tapered to accommodate the wheel well and wiring chase. The opening shall be approximately 15.5" wide x 10.5" high.

HELMET STORAGE

The helmet for the above seat shall be stored in a compartment. A placard shall be provided visible to the riding position warning that injury may occur if helmets are worn while seated.

CREW SEAT – DRIVER'S SIDE, REAR FACING

One (1) H.O. Bostrom Tanker 450 ABTS SCBA fixed base seat shall be installed behind the driver. The seat back shall have a SCBA cavity and auto-pivot-and-return padded headrest. The seat shall be equipped with a red 3-point shoulder harness with lap belt and an automatic retractor built into the seat assembly. The seat shall be upholstered with heavy duty Durawear material.

HELMET STORAGE

The helmet for the above seat shall be stored in a compartment. A placard shall be provided visible to the riding position warning that injury may occur if helmets are worn while seated.

CREW SEAT – OFFICER'S SIDE, REAR FACING

One (1) H.O. Bostrom Tanker 450 ABTS SCBA fixed base seat shall be installed behind the officer. The seat back shall have a SCBA cavity and auto-pivot-and-return

padded headrest. The seat shall be equipped with a red 3-point shoulder harness with lap belt and an automatic retractor built into the seat assembly. The seat shall be upholstered with heavy duty Durawear material.

HELMET STORAGE

The helmet for the above seat shall be stored in a compartment. A placard shall be provided visible to the riding position warning that injury may occur if helmets are worn while seated.

CREW SEAT – DRIVER'S SIDE, FORWARD FACING, INBOARD

One (1) H.O. Bostrom Tanker 400CT ABTS SCBA flip-up base seat shall be installed in the driver's side forward-facing inboard position. The seat back shall have a SCBA cavity and auto-pivot-and-return padded headrest. The seat shall be equipped with a red 3-point shoulder harness with lap belt and an automatic retractor built into the seat assembly. The seat shall be upholstered with heavy duty Durawear material.

HELMET STORAGE

The helmet for the above seat shall be stored in a compartment. A placard shall be provided visible to the riding position warning that injury may occur if helmets are worn while seated.

CREW SEAT – OFFICER'S SIDE, FORWARD FACING, INBOARD

One (1) H.O. Bostrom Tanker 400CT ABTS SCBA flip-up base seat shall be installed in the officer's side forward-facing inboard position. The seat back shall have a SCBA cavity and auto-pivot-and-return padded headrest. The seat shall be equipped with a red 3-point shoulder harness with lap belt and an automatic retractor built into the seat assembly. The seat shall be upholstered with heavy duty Durawear material.

HELMET STORAGE

The helmet for the above seat shall be stored in a compartment. A placard shall be provided visible to the riding position warning that injury may occur if helmets are worn while seated.

SEAT UPHOLSTERY COLOR

The cab seat upholstery shall be black in color.

SCBA BRACKETS

Each SCBA seat in the cab shall feature an H.O. Bostrom SecureAll self contained breathing apparatus (SCBA) locking system. The seat back shall include a bracket which shall be capable of storing most U.S. and international SCBA brands and sizes while in transit or for storage. The bracket shall be easily adjustable for all SCBA brands and cylinder diameters; adjustment points shall utilize similar hardware and adjustments shall be made with one tool.

The bracket shall be adjustable to compensate for different cylinder lengths without the use of tools. The adjustment shall be made by raising a lever and moving the top clamp vertically.

The bracket system shall be free of straps and clamps that may interfere with auxiliary equipment on SCBA units. The center guide fork shall keep the tank in-place for a safe and comfortable fit in seat cavity. Fire fighters shall simply push the SCBA unit against the pivot arm to engage the patented auto-locking system. Once the lock is engaged, the top clamp shall surround the top of the SCBA tank for a secure fit in all directions.

The locking system shall include a release handle integrated into the seat cushion for quick and easy release and to eliminate the need for straps or pull cords which might interfere with other SCBA equipment.

SEAT BELT WARNING SYSTEM

An Akron / Weldon seat belt warning system shall be provided, and shall monitor each seating position. Each seat shall be supplied with a sensor that, in conjunction with the display module located on the dash, shall determine when the seat belt was fastened and if the seat is occupied. An icon shall represent that the seat is properly occupied. An audible and visual alarm shall be activated if the seat is occupied and/or the belt is not fastened in the proper sequence.

CREW SEAT COMPARTMENT

A compartment shall be provided under the forward facing crew seats on the back wall of the cab. Two outward opening doors shall be provided on the front face of the compartment.

UNDER SEAT COMPARTMENT POWER

There shall be a 100v, 20amp shoreline outlet in the under seat compartment. Final positioning shall be determined at Pre Construction.

RADIO ANTENNA MOUNT

There shall be three (2) standard 1.125", 18 thread antenna-mounting base(s) installed on the cab roof, aft of the lightbar, evenly spaced across the roof for high efficiency, low loss, shielded coaxial cable(s) routed to the radio mounting area. A weatherproof cap shall be installed on the mount.

Radio Mounting Location

There shall be a mounting spot for (2) DIN size radios in the dash easily reachable by the driver and passenger. They shall have a minimum clearance depth of 10" for each. The radio antenna cables should terminate in this location. Also there shall be (2) 50 amp 10 gauge red power wire hard wired to constant clean 12v power source. There shall also be (2) 5 amp 14 gauge power wires connected to the ignition power in this location. And then (2) 10 gauge black chassis ground wires at this

ELECTRICAL PROVISION

Wiring shall be provided in the cab for the future installation of electrical chargers. The location shall be determined during the pre-construction conference.

HD STEREO

A Jensen HD Stereo AM/FM/WB World Turner shall be provided with four speakers.

REAR VISION CAMERA SYSTEM

Provided and mounted on the apparatus shall be a Safety Vision SV-CLCD-70 camera kit. The system shall consist of one (1) cab mounted model SV-LCD70 7" LCD monitor, one (1) model SV-620 (Color) high resolution 1/3" CCD camera, one (1) SV-LCD70-CBQKIT Control Box, and one (1) SV-523 65' camera cable. The monitor shall be dash mounted in plain view of the driver. The kit is capable of having three (3) additional cameras installed for a total of four (4).

The camera will be mounted on the rear of the body.

FIRE PUMP CSU-2000

The pump shall be a single stage, midship mounted, Waterous CSU, 2000 gallon per minute, centrifugal type and shall comply with all applicable requirements of the latest standards for automotive fire apparatus of the National Fire Protection Association.

The pump body shall be close-grained gray iron and must be horizontally split in two sections for easy removal of the entire impeller shaft assembly, and designed for complete servicing from the bottom of the truck without disturbing setting of the pump in the chassis or apparatus piping which is connected to the pump. Pump body halves shall be bolted together on a single horizontal face to minimize chance of leakage and facilitate reassembly.

The discharge manifold shall be cast as an integral part of the pump body assembly and shall provide at least three full 3-1/2" openings for ultimate flexibility in providing various discharge outlets for maximum efficiency, and shall be located as follows: one outlet on the right side of the pump body, one outlet on the left side of the body and one outlet directly on top of the pump discharge manifold.

The impeller shall be bronze with double suction inlets, accurately balanced (mechanically and hydraulically), of mixed flow design with reverse flow, labyrinth type, wear rings that resist water bypass and loss of efficiency due to wear. The impeller shall have flame plated hub to assure maximum pump life and efficiency.

Wear rings shall be bronze and shall be easily replaceable to restore original pump efficiency and eliminate the need for replacing the entire pump casing due to wear.

The impeller shaft shall be stainless steel, accurately ground to size and supported at each end by oil or grease lubricated anti-friction ball bearings for rigid and precise support. Bearings shall be protected from water and sediment by suitable stuffing boxes, flinger rings and oil seals. The impeller shaft shall be of two-piece construction separable between the pump and pump transmission to allow true separation of the transmission from the pump without disassembly of either component. No sleeve type bearings shall be used.

Lantern rings shall be located at inner ends of stuffing boxes so that all rings of packing can be removed without removal of the lantern rings. Water shall be fed into stuffing box lantern rings for proper lubrication and cooling when the pump is operating.

PUMP TRANSFER CASE

The pump transmission shall be rigidly attached to the pump body assembly and be of the latest design incorporating a high strength, involute tooth form chain drive capable of operating at high speeds to provide smooth, quiet transfer of power. The shift engagement shall be accomplished by a free-sliding collar and shall incorporate an internal locking mechanism to insure that collar shall be maintained in ROAD or PUMP position.

The pump shift shall be pneumatically operated and shall use a standard automotive air valve to control a double action air shift cylinder so that the pump shift remains in its latest position in the event of loss of air pressure. The in-cab control valve shall include a detent lock to prevent accidental shifting.

PUMP SEAL

The pump seal shall be a split design for ease of repacking.

MANUAL PUMP SHIFT OVERRIDE

A manual emergency override shift shall be provided on the pump panel and may be used by placing both the chassis transmission and the pump air shift control in "neutral" position.

PUMP ANODE

A Waterous pump anode kit assembly shall be provided and installed in the pump body. A minimum of two (2) anodes shall be installed one (1) in the suction side and one (1) in the discharge side of the pump.

PUMP CERTIFICATION

The pump, when dry, shall be capable of taking suction and discharging water in compliance with NFPA #1901 chapter 14. The pump shall be tested by FireOne and shall deliver the percentages of rated capacities at pressures indicated below:

100% of rated capacity @ 150 PSI net pump pressure.

70% of rated capacity @ 200 PSI net pump pressure.

50% of rated capacity @ 250 PSI net pump pressure.

AUXILIARY COOLER

An auxiliary cooler shall be furnished to provide additional cooling to the engine under extreme pumping conditions. Water from the pump is to be piped to the coils of the heat exchanger allowing the engine fluid to be cooled as required.

PUMP CONNECTIONS

All suction and discharge lines (except pump manifolds) 1" and larger shall be heavy-duty stainless steel pipe. Where vibration or chassis flexing may damage or loosen piping or where a coupling is necessary for servicing, a flexible connection shall be furnished. All lines shall be drained by a master drain valve or a separate drain provided at the connection. All individual drain lines for discharges shall be extended with a 90 degree fitting in order to drain below the chassis frame. All water carrying gauge lines shall utilize nylon tubing.

TANK TO PUMP

The booster tank shall be connected to the intake side of the pump with a check valve. The 3" tank to pump line shall run from a bottom sump into the 3" valve. To prevent damage due to chassis flexing or vibration, a short 3" flexible rubber hose coupling shall be used to connect the tank to the intake valve.

BALL VALVES

All ball valves shall be stainless steel. No exceptions.

VALVE

The valve shall be an Elkhart, full flow trunnion mounted ball valve with two flanges and constructed with two self-adjusting seat/flange seals. The seats and ball shall be of Stainless Steel. The valve shall have no more than three O-rings and no O-rings between the body and adapter flanges. The valve shall have two seats to hold pressure or vacuum in either direction. The valve shall be capable of swinging out of line without removing all flange bolts for easy replacement of ball and seats.

VALVE ACTUATOR

The valve shall be controlled by a Twist Lock type valve control handle.

TANK FILL

A 3" tank fill line shall be provided, using a quarter turn full flow ball valve controlled from the pump operator's panel.

VALVE

The valve shall be an Elkhart, full flow trunnion mounted ball valve with two flanges and constructed with two self-adjusting seat/flange seals. The seats and ball shall be of Stainless Steel. The valve shall have no more than three O-rings and no O-rings between the body and adapter flanges. The valve shall have two seats to hold pressure or vacuum in either direction. The valve shall be capable of swinging out of line without removing all flange bolts for easy replacement of ball and seats.

VALVE ACTUATOR

The valve shall be controlled by a Twist Lock type valve control handle.

PRESSURE GOVERNOR

Apparatus shall be equipped with a Class1 Pressure Governor that is connected to the Electronic Control Module (ECM) mounted on the engine. The Governor will operate as a pressure sensor (regulating) governor (PSG) utilizing the engine's data for optimal resolution and response.

Programmable presets for RPM and Pressure settings shall be easily configurable using the menu structure.

Engine RPM, system voltage, engine oil pressure and engine temperature with audible alarm output for all shall be provided.

INTAKE RELIEF

There shall be an Elkhart Model 40 intake relief valve installed on the intake side of the pump. The surplus water shall be discharged away from the pump operator and terminate with Male NST hose thread. System is field adjustable.

6" PUMP INLET LEFT SIDE

A 6" diameter suction port with 6" NST male threads shall be provided, on the left side of vehicle. The inlet shall extend through the side pump panels and come complete with removable strainer and long handle chrome-plated cap.

INTAKE VALVE

A Waterous butterfly intake valve shall be installed on the above specified intake. It shall be electrically actuated from the pump panel. The valve shall include a pressure relief valve, and bleeder valve to guard against incoming pressure surges.

3" AUXILIARY INLET LEFT SIDE

One 3" gated inlet valve shall be provided on the left side pump panel. The valve shall be supplied with chrome plate female swivel, plug, chain, and removable strainer.

VALVE

The valve shall be an Elkhart, full flow trunnion mounted ball valve with two flanges and constructed with two self-adjusting seat/flange seals. The seats and ball shall be of Stainless Steel. The valve shall have no more than three O-rings and no O-rings

between the body and adapter flanges. The valve shall have two seats to hold pressure or vacuum in either direction. The valve shall be capable of swinging out of line without removing all flange bolts for easy replacement of ball and seats.

VALVE ACTUATOR

The valve shall be controlled by a swing type handle located at the operator's panel. The handle shall have a full 90 degree movement.

THREAD TERMINATION

The above discharge shall terminate with National Standard Threads.

6" PUMP INLET RIGHT SIDE

A 6" diameter suction port with 6" NST male threads shall be provided, on the right side of vehicle. The inlet shall extend through the side pump panels and come complete with removable strainer and long handle chrome-plated cap.

INTAKE VALVE

A Waterous butterfly intake valve shall be installed on the above specified intake. It shall be electrically actuated from the pump panel. The valve shall include a pressure relief valve, and bleeder valve to guard against incoming pressure surges.

3" AUXILIARY INLET RIGHT SIDE

A 3" gated inlet valve shall be provided on the right side pump panel. The valve shall be supplied with chrome plate female swivel, plug, chain, and removable strainer.

VALVE

The valve shall be an Elkhart, full flow trunnion mounted ball valve with two flanges and constructed with two self-adjusting seat/flange seals. The seats and ball shall be of Stainless Steel. The valve shall have no more than three O-rings and no O-rings between the body and adapter flanges. The valve shall have two seats to hold pressure or vacuum in either direction. The valve shall be capable of swinging out of line without removing all flange bolts for easy replacement of ball and seats.

VALVE ACTUATOR

The valve shall be controlled by a swing type handle located at the operator's panel. The handle shall have a full 90 degree movement.

THREAD TERMINATION

The above discharge shall terminate with National Standard Threads.

AUXILIARY INLET ADAPTOR

The 3" inlets will have 3" to 2-1/2" Inlet adaptors with caps/chains provided.

FRONT SUCTION

A 6" front suction, with chrome long handle cap, shall be provided. The inlet pipe shall be constructed of 5" stainless steel pipe. An air bleeder line shall be provided to eliminate trapped air. The inlet shall terminate at the front bumper.

INTAKE VALVE

A Waterous butterfly intake valve shall be installed on the above specified intake. It shall be electrically actuated from the pump panel. The valve shall include a pressure relief valve, and bleeder valve to guard against incoming pressure surges.

DISCHARGE #1 - LEFT

The discharge in position #1 on the left side of the apparatus shall include the following features.

A 4" discharge shall be provided on the left side of the apparatus.

VALVE

The valve shall be an Elkhart, full flow trunnion mounted ball valve with two flanges and constructed with two self-adjusting seat/flange seals. The seats and ball shall be of Stainless Steel. The valve shall have no more than three O-rings and no O-rings between the body and adapter flanges. The valve shall have two seats to hold pressure or vacuum in either direction. The valve shall be capable of swinging out of line without removing all flange bolts for easy replacement of ball and seats.

VALVE ACTUATOR

The valve shall be controlled by an Elkhart UBEC-1 electric actuator located at the operator's panel. The actuator shall display the valve position.

2.5" PRESSURE GAUGE

A NoShok liquid filled individual line pressure gauge shall be provided. The gauge shall be 2.5" in diameter with white faces and black lettering. The gauge shall have a pressure range of 0-400 psi.

THREAD TERMINATION

The above discharge shall terminate with National Standard Threads.

DISCHARGE ADAPTER

One (1) Task Force Tips #AA3ST-NP 4" NST female x 5" Storz adapter with #A01ST 5" Storz cap and chain shall be provided for the above discharge.

DISCHARGE #2 - LEFT

The discharge in position #2 on the left side of the apparatus shall include the following features.

A 3" discharge shall be provided on the left side of the apparatus.

VALVE, SLOW CLOSE

The valve shall be an Elkhart, slow close type, full flow trunnion mounted ball valve with two flanges and constructed with two self-adjusting seat/flange seals. The seats and ball shall be of Stainless Steel. The valve shall have no more than three O-rings and no O-rings between the body and adapter flanges. The valve shall have two seats to hold pressure or vacuum in either direction. The valve shall be capable of swinging out of line without removing all flange bolts for easy replacement of ball and seats.

VALVE ACTUATOR

The valve shall be controlled by an Elkhart RC-6 control unit located at the operator's panel. The valve shall be controlled by a Twist Lock type valve control handle.

2.5" PRESSURE GAUGE

A NoShok liquid filled individual line pressure gauge shall be provided. The gauge shall be 2.5" in diameter with white faces and black lettering. The gauge shall have a pressure range of 0-400 psi.

THREAD TERMINATION

The above discharge shall terminate with National Standard Threads.

DISCHARGE ADAPTER

One (1) 3" NST female x 2.5" NST male chrome plated adapter with 2.5" NST chrome plated cap and chain shall be provided for the above discharge.

DISCHARGE #3 - RIGHT

The discharge in position #3 on the right side of the apparatus shall include the following features.

A 3" discharge shall be provided on the right side of the apparatus.

VALVE, SLOW CLOSE

The valve shall be an Elkhart, slow close type, full flow trunnion mounted ball valve with two flanges and constructed with two self-adjusting seat/flange seals. The seats and ball shall be of Stainless Steel. The valve shall have no more than three O-rings and no O-rings between the body and adapter flanges. The valve shall have two seats to hold pressure or vacuum in either direction. The valve shall be capable of swinging out of line without removing all flange bolts for easy replacement of ball and seats.

VALVE ACTUATOR

The valve shall be controlled by an Elkhart RC-6 control unit located at the operator's panel. The valve shall be controlled by a Twist Lock type valve control handle.

2.5" PRESSURE GAUGE

A NoShok liquid filled individual line pressure gauge shall be provided. The gauge shall be 2.5" in diameter with white faces and black lettering. The gauge shall have a pressure range of 0-400 psi.

THREAD TERMINATION

The above discharge shall terminate with National Standard Threads.

DISCHARGE ADAPTER

One (1) 3" NST female x 2.5" NST male chrome plated adapter with 2.5" NST chrome plated cap and chain shall be provided for the above discharge.

3" REAR OUTLET

There shall be a 3" gated outlet piped to the right rear, adjacent to the hose bed. The outlet shall be installed with proper clearance for spanner wrenches or adapters. Plumbing shall be 3" piping and a full flow 3" ball valve with the control at the pump operator's panel.

VALVE, SLOW CLOSE

The valve shall be an Elkhart, slow close type, full flow trunnion mounted ball valve with two flanges and constructed with two self-adjusting seat/flange seals. The seats and ball shall be of Stainless Steel. The valve shall have no more than three O-rings and no O-rings between the body and adapter flanges. The valve shall have two seats to hold pressure or vacuum in either direction. The valve shall be capable of swinging out of line without removing all flange bolts for easy replacement of ball and seats.

VALVE ACTUATOR

The valve shall be controlled by an Elkhart RC-6 control unit located at the operator's panel. The valve shall be controlled by a Twist Lock type valve control handle.

2.5" PRESSURE GAUGE

A NoShok liquid filled individual line pressure gauge shall be provided. The gauge shall be 2.5" in diameter with white faces and black lettering. The gauge shall have a pressure range of 0-400 psi.

THREAD TERMINATION

The above discharge shall terminate with National Standard Threads.

DISCHARGE ADAPTER

One (1) 3" NST female x 2.5" NST male chrome plated adapter with 2.5" NST chrome plated cap and chain shall be provided for the above discharge.

FRONT BUMPER DISCHARGE

A 1.5" discharge with 2" plumbing shall be provided at the front bumper. The valve shall be remote controlled at the pump panel.

VALVE

The valve shall be an Elkhart, full flow trunnion mounted ball valve with two flanges and constructed with two self-adjusting seat/flange seals. The seats and ball shall be of Stainless Steel. The valve shall have no more than three O-rings and no O-rings between the body and adapter flanges. The valve shall have two seats to hold pressure or vacuum in either direction. The valve shall be capable of swinging out of line without removing all flange bolts for easy replacement of ball and seats.

VALVE ACTUATOR

The valve shall be controlled by an Elkhart RC-6 control unit located at the operator's panel. The valve shall be controlled by a Twist Lock type valve control handle.

2.5" PRESSURE GAUGE

A NoShok liquid filled individual line pressure gauge shall be provided. The gauge shall be 2.5" in diameter with white faces and black lettering. The gauge shall have a pressure range of 0-400 psi.

THREAD TERMINATION

The above discharge shall terminate with National Standard Threads.

DELUGE RISER

A 3" deluge riser shall be installed above the pump in such a manner that a monitor can be mounted and used effectively. Piping shall be rigidly braced. The riser shall be gated and controlled from the pump operators panel.

VALVE

The valve shall be an Elkhart, full flow trunnion mounted ball valve with two flanges and constructed with two self-adjusting seat/flange seals. The seats and ball shall be of Stainless Steel. The valve shall have no more than three O-rings and no O-rings between the body and adapter flanges. The valve shall have two seats to hold pressure or vacuum in either direction. The valve shall be capable of swinging out of line without removing all flange bolts for easy replacement of ball and seats.

VALVE ACTUATOR

The valve shall be controlled by an Elkhart UBEC-1 electric actuator located at the operator's panel. The actuator shall display the valve position.

2.5" PRESSURE GAUGE

A NoShok liquid filled individual line pressure gauge shall be provided. The gauge shall be 2.5" in diameter with white faces and black lettering. The gauge shall have a pressure range of 0-400 psi.

DECK GUN TERMINATION

A four-bolt compound flange shall be provided on top of the deck gun piping.

DECK GUN

There shall be one (1) Elkhart Vulcan model 8500 deck gun monitor with a 282A stream shaper and ST-194 stack tips.

SPEEDLAYS

Two (2) speedlays shall be provided under the top mount console. The piping and valves shall be 2", the swivel shall be 1.5". The valves shall be the "drop-out" style, push/pull controlled from the pump panel. Each compartment shall hold 300 ft. of 1.75" double jacket hose. Both beds shall be of the same dimension.

VALVE

The valve shall be an Elkhart, full flow trunnion mounted ball valve with two flanges and constructed with two self-adjusting seat/flange seals. The seats and ball shall be of Stainless Steel. The valve shall have no more than three O-rings and no O-rings between the body and adapter flanges. The valve shall have two seats to hold pressure or vacuum in either direction. The valve shall be capable of swinging out of line without removing all flange bolts for easy replacement of ball and seats.

VALVE ACTUATOR

The valve shall be controlled by an Elkhart RC-6 control unit located at the operator's panel. The valve shall be controlled by a Twist Lock type valve control handle.

2.5" PRESSURE GAUGE

A NoShok liquid filled individual line pressure gauge shall be provided. The gauge shall be 2.5" in diameter with white faces and black lettering. The gauge shall have a pressure range of 0-400 psi.

THREAD TERMINATION

The above discharge shall terminate with National Standard Threads.

SPEEDLAY COVER

A vinyl cover shall be provided to enclose the ends of the speedlays.

MASTER PUMP DRAIN

A multiport master drain valve shall be provided and plumbed to multiple locations on the main pump body. The valve assembly shall be clearly marked as the Master Drain.

DRAIN VALVES LIFT UP STYLE

Vertical lift up style, quarter turn style drain valves shall be provided for each suction inlet, or discharge outlet as specified. Each drain shall be clearly marked and color coded to match the corresponding suction of discharge.

COMPRESSED AIR FOAM SYSTEM (CAFS)

WATEROUS SPLIT-SHAFT PUMP

The ONE STEP™ CAFSystem is currently available on Waterous CS, CSU, CX and CMU midship pumps with split-shaft transmissions.

CSU Flow Specs:

1250 to 2250 GPM @ 150 psi

(5000 to 9000 l/min @ 10 bar)

150-OS GHH RAND AIR COMPRESSOR

1. Quiet, efficient and dependable rotary screw compressor
2. 150 sCFM (4.25 m^3/min)
3. Toothed-belt drive requires no lubrication or maintenance

AQUIS™ 2.5 FOAM PROPORTIONER

1. 2.5 GPM (9.5 l/min) @ 150 PSI (10 bar)
2. Exceeds NFPA 1901 requirements for proportioning accuracy
3. Pre-plumbed and pre-mounted

ONE STEP™ COMPACT FOAM GENERATOR

A characteristic of each ONE STEP™ CAFSystem is the pre-set flow rate and pre-set pressure for water and air. The operator does not have to adjust flows and pressures during operation.

ONE STEP™ CAFSystem uses a stand-alone "Compact Foam Generator" (CFG) for each simultaneously operated discharge outlet. Three 2" Foam Generators are standard. These are specially developed and patented devices in which the ONE STEP extinguishing agent will be generated. These foam generators include all necessary elements such as:

1. Volume flow regulation of water and air
2. Volume flow limitations of water and air
3. Non-return valves for water and air
4. Mixing chamber
5. Mixing pressure control valve
6. Wet-dry changeover

DIGITAL CONTROL SYSTEM

1. 8" Control System
    1. Engages Pump and Compressor
    2. Engages the ONE STEP™ CAFSystem
    3. Select from Dry or Wet Foam
    4. Monitor Discharges
    5. Monitor Compressor Performance

Mixing Pressure Control Valve

The ONE STEP™ CAFSystem uses an independent, patented pressure regulation, which keeps constant mixing pressure in the mixing chamber of the foam generator. This pressure regulation allows a variation of pump discharge pressure above the minimum working pressure of the ONE STEP without disrupting the function of the ONE STEP systems or changing the consistency of the extinguishing agent.

Air Compressor

GHH-Rand air end with tapered roller bearings and triple lip shaft seal, oil-flooded, rotary screw type, sized to supply 150 scfm (4.25 m^3/min) at a minimum of 125 P.S.I.G (8.6 bar).

Pneumatic Modulating Inlet Valve

The air compressor is controlled by the pneumatic modulation inlet valve mounted on the air end. The pneumatic modulating inlet valve controls air delivery while maintaining constant pressure.

Fixed Air Pressure Operation

The compressor supplies a fixed air pressure supply to the foam generators at 120 PSI (8 Bar). Pressure balancing systems are not used or required.

1. Fixed - Air pressure defaults to manual setting on compressor mounted control valve.
2. Unload - Air pressure reduced to 40 P.S.I.G. (2.75 bar) for standby operations or when water only from the pump is required

Air Compressor Drive

The compressor is driven off the back of a standard Waterous pump transmission. The compressor drive is direct. The compressor shall be run in unload mode for pump testing and high pressure pump use. Power is transferred via a synchronous drive "toothed belt" with an adjustable tensioner. The system is designated to operate the air end at rated capacity when the fire pump is developing 130 to 140 P.S.I.G. (9 to 9.7 bar) in a "no flow" state.

Air Compressor Oil System

A spin-on, full-flow oil filter unit is part of the system to control oil flow to the cooler. All oil lines are routed in braided hose conforming to SAE 100R1 standards for hydraulic hose.

Modular Air/Oil Separator Unit

Replacement elements for the oil filter and separator are available.

Air Compressor Cooling System

The air compressor is cooled by the Waterous fire pump[1], utilizing an all copper and brass shell and tube heat exchanger. When the fire pump is operating, water flows through the heat exchanger while an in-line removable strainer, on the water inlet side, prevents clogging. The system maintains oil temperature within 160° to 225°F (71° to 107° C).

Foam Concentrate Piping

All concentrate piping is stainless steel, brass or high pressure wire braid reinforced hose with stainless steel or brass fittings.

Foam Manifolds

Foam manifolds are constructed of cast iron. The manifold is a fully integrated assembly with foam injector port, flow meter mount and high-flow, low-loss, spring-assisted brass swing check valve to prevent back-flow of foam concentrate or foam solution into the pump.

Foam Management System

Aquis 2.5™ (Standard)

Microprocessor Controller

AQUIS™ is equipped with a 16-bit, mixed-signal microcontroller with a 60kB flash memory, 2 kB RAM and 12-bit analog to digital converter. This allows the AQUIS™ to receive input from the flowmeter and temperature sensor, controlling the foam pump motor to provide accurate injection into the foam manifold.

Operator Interface Terminal

The Operator Interface Terminal (OIT), mounted on the pump operator's panel allows the operator to perform the following functions:

1. Provide rotary dial control of foam proportioning rates from 0.1% to 1%, in infinite increments
2. Calibrate flow rate
3. Flashes and then displays a steady "low concentrate" warning when the foam concentrate tank runs low - system shuts off after two minutes
4. Flash a "no concentrate" warning when the foam concentrate tank is empty
5. Flash an "error" warning with associated code in the event of an electronic malfunction
6. Provide a manual back-up mode, controlled by the operator

Foam Pump

The 12 or 24-volt, electric motor driven, positive displacement triplex plunger foam pump is equipped with an aluminum crankcase, ball bearings, forged brass pump body and manifold, solid ceramic plungers, stainless steel check valves and piston guides, Buna packing and preset thermal and pressure relief valves.

The foam pump is rated at 2.5 GPM @ 150 psi (9.46 l/min @ 10 bar) with operating pressures up to 450 psi (32 bar). Maximum electrical load of 40 amps @ 12 VDC and 21 amps @ 24 VDC.

A pump motor electronic driver, located inside the controller housing, receives signals from the microcontroller and powers the 1/2 hp (.4 kW) electric motor in a variable speed duty cycle to ensure that the correct amount of foam concentrate set by the pump operator is injected into the water stream.

Optional Advantus® 3E or 6E

A fully automatic electronic direct foam injection system is furnished and installed. The system is capable of Class A foam concentrates and most Class B foam concentrates. The system includes the following:

Digital Electronic Control Display

Located on the pump operator's panel, the electronic control display enables the operator to perform the following functions:

1. Provide push-button control of foam proportioning rates from 0.1% to 1%, in 0.1% increments; 3% and 6%
2. Show current flow-per-minute of water
3. Show total volume of water discharged during and after foam operations are completed
4. Show total amount of foam concentrate used
5. Show which foam supply tank is in use
6. Perform setup and calibrate functions for the microcontroller
7. Flash a "low concentrate" warning when the foam concentrate tank(s) run(s) low
8. Flash an "error" warning with associated code in the event of an electronic malfunction
9. Provide a manual back-up mode, controlled by the operator

12 or 24-Volt Electric Motor

A 12 or 24-volt electric motor driven Hydra-Cell positive displacement foam concentrate pump, rated at 3 GPM @ 150 psi (11.3 l/min @10 bar) or 6 GPM @ 150 psi (22.6 l/min @ 10 bar) and with operating pressures up to 450 psi (32 bar).

Warranty

1. Five-Year Limited Warranty

CAFS shall be provided to the following discharges:

1. Front Bumper 1.5" Discharge
2. Speed Lay #1, 1.5" Discharge
3. Speed Lay #2, 1.5" Discharge

FOAM TANK

There shall be a 30-gallon foam tank. The tank shall be part of the main booster tank. There shall be a 3" PVC fill tower and cap and a tank vent. There shall be a 1-1/2" flanged outlet and drain valve at the lowest point in the tank.

PUMP OPERATOR'S TOP MOUNT CONTROL PANEL

The pump operators panel shall be a top mount control type located forward of the apparatus body. The operator's panel shall be positioned and designed to provide full 360° visibility for the pump operator. The operator shall face the rear of the apparatus to operate the controls.

The panel shall be constructed in a manner to have two geometric planes. The lower more horizontal shall hold the valve control levers and the upper more vertical shall house the gauges. The panel shall be hinged to pivot for easy access.

The pump controls and gauges shall be properly marked on the operator's panel. The control panel shall be laid out in a user-friendly manner.

All valve controls shall have the corresponding discharge gauge located immediately adjacent to control handle to allow operator to view the discharge pressure without searching the panel.

A full-width lightbar shall be provided over the panel, hinged for quick access to the gauges.

Access doors shall be provided on each side of the body to allow entrance into the pump area.

WALKWAY

A walkway shall be provided behind the cab forward of the pump module. The walkway shall be a minimum of 20" wide accessible from both sides of the apparatus. The walkway surface shall be constructed of .188 serrated aluminum diamond plate adequately reinforced with 1.5" x 3" x .25" T-6061 aluminum alloy extruded channel. The back exterior wall of cab shall be covered with diamond plate for maximum protection against abrasion caused during normal use.

PANEL FINISH

The panels shall be constructed of black vinyl covered aluminum for maximum protection against abrasion caused during normal use.

ESCUTCHEON PLATES

The pump panel shall be equipped with color-coded removable escutcheon plates around the suction and discharge valves.

COLOR CODING

Each discharge valve control, outlet, and corresponding line gauge shall be color-coded. The color-coding shall be (as applicable):

#1 Discharge - Yellow

#2 Discharge – White

#3 Discharge – Light Blue

#4 Discharge - Black

#5 Discharge - Green

#1 Pre-Connect - Orange

#2 Pre-Connect - Red

Front Bumper Line - Magenta

Large Diameter Discharge – Yellow with White Border

Right Rear Discharge – Blue

Deck Gun – Silver

Inlets – Burgundy

Tank Fill - Lime Green

Tank to Pump – Burgundy

RUNNING BOARD TROUGH

A trough shall be provided in the left side running board to hold a 15-foot length of 5" hose. Velcro straps shall be provided to secure the hose.

RUNNING BOARD TROUGH

A trough shall be provided in the right side running board to hold a 15-foot length of 5" hose. Velcro straps shall be provided to secure the hose.

WALKWAY COMPARTMENTS

A compartment shall be provided each side under the top mount pump control walkway. The compartment dimension shall be approximately 12" tall x 16" deep x 24" wide. The compartment shall be equipped with a hinged door and D-ring latch.

PUMP PANEL LIGHTING, LED

The driver's side pump panel controls and gauges shall be illuminated by a full width LED light strip.

PUMP PANEL LIGHTS

Each pump panel shall be illuminated by a minimum of three (3) Weldon model #2631 LED lights. The lights shall be mounted in hood directly above the pump panel. A switch located on the pump panel shall activate the lights.

PUMP ENGAGED LIGHT

A green light shall be provided on the pump operator's panel that shall illuminate when pump is engaged.

PUMP PANEL GAUGES AND CONTROLS

The following gauges and controls shall be provided at the pump panel:

Two (2) certified laboratory test gauge outlets.

Pump primer control.

Master drain control and additional drains as needed.

Tank-fill and pump cooler valve controls.

Tank to pump valve control.

Pump capacity rating plate.

All discharge controls.

Two (2) master pump gauges.

Gauges on all 1-1/2" and larger discharge lines.

PRIMING SYSTEM

The priming system shall consist of two parts. The priming pump will be an electrically driven rotary vane priming pump, rigidly attached to the pump transmission. A single "T" handle pull handle will be provided on the pump operators panel to activate the priming valve and the priming pump. Priming valve actuation may be accomplished while the main pump is in operation, if necessary, to assure a complete, continuous prime.

(1) PRIMER BUTTON - MAIN SUCTION

A single panel mounted control will activate the priming pump and open the priming valve to the pump.

THERMAL RELIEF VALVE

There shall be a Hale TRV-L Thermal Relief Valve supplied. The valve shall automatically dump a controlled amount of water to atmosphere when the pump water exceeds 120 degrees Fahrenheit. The valve shall re-set automatically. A light shall be provided at the pump panel, which will illuminate when the pump reaches 120 degrees Fahrenheit to warn the operator that the pump is automatically dumping.

FUEL GAUGE

A fuel gauge shall be provided at the pump operator's panel to monitor the apparatus fuel level.

AIR HORN BUTTON

A push button switch shall be provided on pump operators panel to activate the air horns.

4" MASTER GAUGES

NoShok liquid filled pump pressure and vacuum gauges shall be provided. The gauges shall be 4" in diameter with white faces and black lettering. The gauges shall have a pressure range of 30"-0-400 psi.

WATER TANK LEVEL GAUGE

Fire Research TankVision® model WL2000 water tank volume indicator kit shall be installed. The kit shall include an electronic indicator module, a pressure sensor, and sensor cable. The indicator shall show the volume of water in the tank on nine (9) easy to see super bright LEDs. A wide view lens over the LEDs shall provide for a viewing angle of 180 degrees. The indicator case shall be waterproof and manufactured of aluminum.

The program features shall be accessed from the front of the indicator module. The program shall support self-diagnostics capabilities, self-calibration, and a datalink to connect remote indicators. Low water warnings shall include flashing LEDs at 25%, down chasing LEDs when the tank is almost empty.

The indicator shall receive an input signal from an electronic pressure sensor. The sensor shall be mounted on the outside of the water tank near the bottom; no probe shall be place on the interior of the tank. Wiring shall be weather resistant and have automotive type plug-in connectors.

The gauge shall be located on the pump operator's panel.

WATER TANK GAUGE

Two (2) Whelen PSTANK LED strip lights shall be provided. The lights shall be steady burn green, blue, amber and flashing red to indicate water level in the booster tank.

CLASS A FOAM TANK LEVEL GAUGE

A Fire Research TankVision® model WL2600 foam tank volume indicator kit shall be installed. The kit shall include an electronic indicator module, a pressure sensor, and sensor cable. The indicator shall show the volume of Class A foam in the tank on nine (9) easy to see super bright LEDs. A wide view lens over the LEDs shall provide for a viewing angle of 180 degrees. The indicator case shall be waterproof and manufactured of aluminum.

The program features shall be accessed from the front of the indicator module. The program shall support self-diagnostics capabilities, self-calibration, and a datalink to

connect remote indicators. Low water warnings shall include flashing LEDs at 25%, down chasing LEDs when the tank is almost empty.

The indicator shall receive an input signal from an electronic pressure sensor. The sensor shall be mounted on the outside of the water tank near the bottom; no probe shall be place on the interior of the tank. Wiring shall be weather resistant and have automotive type plug-in connectors.

The gauge shall be located on the pump operator's panel.

WATER TANK

The tank shall be constructed of PT3™ polypropylene material by United Plastic Fabricating (UPF). This material shall be a non-corrosive stress relieved thermoplastic and UV stabilized for maximum protection. Tank shell thickness may vary depending on the application and may range from ½ to 1" as required. Internal baffles are generally 3/8" in thickness.

The tank shall be of a specific configuration and shall be designed to be completely independent of the body and compartments. Joints and seams shall be fused using nitrogen gas as required and tested for maximum strength and integrity. The tank construction shall include PolyProSeal™ technology wherein a sealant shall be installed between the plastic components prior to being fusion welded. This sealing method will provide a liquid barrier offering leak protection in the event of a weld compromise. The top of the booster tank shall be fitted with removable lifting assembly designed to facilitate tank removal. The transverse and longitudinal swash partitions shall be manufactured of a minimum of 3/8" PT3™ polypropylene. All partitions shall be equipped with vent and air holes to permit movement of air and water between compartments. The partitions shall be designed to provide maximum water flow. All swash partitions shall interlock with one another and completely fused to each other as well as to the walls of the tank. All partitions and spacing shall comply with NFPA 1901. The walls shall be welded to the floor of the tank providing maximum strength as part of the tank's unique Full Floor Design™.

The tank shall have a combination vent and manual fill tower. The fill tower shall be constructed of 1/2" PT3™ polypropylene and shall be a minimum dimension of 8" x 8" outer perimeter. The fill tower shall be blue in color indicating that it is a water-only fill tower. The tower shall have a 1/4" thick removable polypropylene screen and a PT3™ polypropylene hinged cover. The capacity of the tank shall be engraved on the top of the fill tower lid. Inside the fill tower there shall be a combination vent/overflow pipe. The vent overflow shall be a minimum of schedule 40 polypropylene pipe with a minimum I.D. of 4" that is designed to run through the tank, and shall be piped to discharge water behind the rear wheels as required in NFPA 1901 so as to not interfere with rear tire traction.

The tank cover shall be constructed of 1/2" thick PT3™ polypropylene and UV stabilized, to incorporate a multi-piece locking design, which allows for individual removal and inspection if necessary. The tank cover(s) shall be flush or recessed 3/8" from the top of the tank and shall be fused to the tank walls and longitudinal partitions for maximum integrity. Each one of the covers shall have hold downs consisting of 2" minimum polypropylene dowels spaced a maximum of 40" apart. These dowels shall extend through the covers and will assist in keeping the covers rigid under fast filling conditions. A minimum of two lifting dowels shall accommodate the necessary lifting hardware.

There shall be one (1) sump constructed of a minimum of 1/2" PT3™ polypropylene and be located in the left front quarter of the tank, unless specified otherwise. On all tanks that require a front suction, a 3" schedule 40 polypropylene pipe shall be installed that will incorporate a dip tube from the front of the tank to the sump location. The sump shall have a minimum 3" N.P.T. threaded outlet on the bottom for a drain plug per NFPA. This shall be used as a combination clean-out and drain. All tanks shall have an anti-swirl plate located approximately 3" above the inside floor.

There shall be two (2) standard tank outlets: one for the tank-to-pump suction line, which shall be sized to provide adequate water flow to the pump; and, one for tank fill line, which shall be sized according to the NFPA minimum size chart for booster tanks. All tank fill couplings shall be backed with flow deflectors to break up the stream of water entering the tank, and be capable of withstanding sustained fill rates of up to 1000 G.P.M. All auxiliary outlets and inlets must meet all NFPA guidelines in effect at the time of manufacture.

The UPF Poly-Tank® III shall rest on the body cross members in conjunction with such additional cross members, spaced at a distance that would not allow for more than 530 square inches of unsupported area under the tank floor. In cases where overall height of the tank exceeds 40 inches, cross member spacing must be decreased to allow for not more than 400 square inches of unsupported area.

The tank shall be isolated from the cross members through the use of hard rubber strips with a minimum thickness and width dimension of 1/4" x 1". The rubber must be installed so it will not become dislodged during normal operation of the vehicle. Additionally, the tank must be supported around the entire bottom outside perimeter and captured both in the front and rear as well as side to side to prevent tank from shifting during vehicle operation.

The tank shall be completely removable without disturbing or dismantling the apparatus structure.

The tank shall be tested and certified as to capacity on a calibrated and certified tilting scale. Each tank shall be weighed empty and full to provide precise fluid capacity. The tank shall be delivered with a Certificate of Capacity delineating the weight empty and full and the resultant capacity based on weight. Engineering estimates for capacity calculations shall not be permitted for capacity certification. A center of gravity and weight calculation for both empty and full conditions shall be required with each tank.

The tank shall have a limited Lifetime warranty that provides warranty service for the life of the fire apparatus in which the tank is installed. Warranties are transferable if the apparatus ownership changes by requesting the transfer from UPF. In applications where the tank will be subject to severe conditions, the tank may have a warranty unique to the application that is clearly defined for each such application.

WATER TANK

The water tank shall have a capacity of 1,000 U.S. gallons.

APPARATUS BODY

The apparatus body shall be constructed of #4 brushed finish #304 stainless steel. The compartments shall be of a modular design supported by a structural channel and angle sub-frame.

The interior of the compartments shall be brushed stainless steel finish. Each compartment shall have sweep-out flooring design with no obstructions at the floor bottom. Compartments shall be of the bolted construction for easy repair and replacement. Compartment tops shall be constructed of .125" fire apparatus quality serrated aluminum diamond plate. The compartment top shall be bolted in place for easy removal. Between the body and the compartment top there shall be a rubberized isolation strip to prevent electrolysis between dissimilar metals.

Each compartment shall be properly vented with louvers.

The rear side fenders shall be removable stainless steel panels. The wheel liners shall be constructed of pre-formed FRP composite material to provide a maintenance free, damage resistant surface.

The body shall have a side protection rub-rail along the length of the body on the right, left and rear lower portion of the body. The rub-rail shall be a C-channel design, constructed of polished stainless steel. The rail shall be a minimum of 2-3/8" wide x 1-1/4" deep.

REAR STEP COMPARTMENT

There shall be a compartment provided at the rear step. The compartment shall be approximately 46" wide x 36" high x 24" deep.

COMPARTMENTATION LEFT SIDE

L1 - There shall be a compartment ahead of the rear axle approximately 50" wide x 60" high x 25" deep.

L2 - There shall be a compartment over the rear axle approximately 60" wide x 30" high x 25" deep.

L3 - There shall be a compartment behind the rear axle approximately 47" wide x 60" high x 25" deep.

COMPARTMENTATION RIGHT SIDE

R1 - There shall be a compartment ahead of the rear axle approximately 50" wide x 60" high x 25" deep.

R2 - There shall be a compartment over the rear axle approximately 60" wide x 30" high x 25" deep.

R3 - There shall be a compartment behind the rear axle approximately 47" wide x 60" high x 25" deep.

BODY SUBFRAME

A stainless steel subframe/undercarriage shall be provided for the body compartments.

COMPARTMENT INTERIOR - L1

The L1 compartment on the left side of the apparatus shall include the following features:

ADJUSTABLE SHELF

There shall be an adjustable shelf provided and installed in the compartment. The shelf shall be fabricated of .188" aluminum plate.

ADJUSTABLE ROLLOUT DRAWER

There shall be two (2) 250 lb. capacity rollout drawers supplied and installed in a compartment. The drawer shall be approximately 3" deep and shall be mounted on adjustable tracks.

One tray shall have vertical dividers for the storage of rolled hose provided by the Fire Department. Quantities and hose sizes shall be discussed at Pre Construction.

One tray shall have provisions made for the mounting of hose/discharge adaptors. Zico Quik Mount adaptors will be provided in quantities to be determined at Pre Construction.

COMPARTMENT MATTING

Turtle Tile interlock matting material shall be provided in the compartment.

COMPARTMENT INTERIOR - L2

The L2 compartment on the left side of the apparatus shall include the following features:

ELECTRICAL OUTLET

There shall be a 120v/10amp outlet wired to shore power and the generator. The outlet shall have a weatherproof cover and be mounted in a position to be determined at Pre Construction.

COMPARTMENT MATTING

Turtle Tile interlock matting material shall be provided in the compartment.

COMPARTMENT INTERIOR - L3

The L3 compartment on the left side of the apparatus shall include the following features:

ADJUSTABLE SHELF

There shall be two (2) adjustable shelves provided and installed in the compartment. The shelf shall be fabricated of .188" aluminum plate.

ADJUSTABLE ROLLOUT DRAWER

There shall be a 250 lb. capacity rollout drawer supplied and installed in a compartment. The drawer shall be approximately 3" deep and shall be mounted on adjustable tracks.

Arrangements shall be made for the storage of the following equipment on this roll out tray, space depending:

1 x 6" chrome barrel strainer (provided)

1 x 6" box strainer (provided)

1 x 6" floating strainer (provided)

1 x 6" low flow strainer (provided)

1 x 2-1/2" chrome barrel strainer (provided)

1 x 2-1/2" box strainer (provided)

1 x portable base for deck gun (provided)

COMPARTMENT MATTING

Turtle Tile interlock matting material shall be provided in the compartment.

COMPARTMENT INTERIOR - R1

The R1 compartment on the right side of the apparatus shall include the following features:

ADJUSTABLE SHELF

There shall be two (2) adjustable shelves provided and installed in the compartment. The shelf shall be fabricated of .188" aluminum plate.

ADJUSTABLE ROLLOUT DRAWER

There shall be a 250 lb. capacity rollout drawer supplied and installed in a compartment. The drawer shall be approximately 3" deep and shall be mounted on adjustable tracks.

The roll out drawers will have provisions for the storage of four (4) manufacturer provided fire extinguishers and two (2) Fire Department provided SCBA bottles.

COMPARTMENT MATTING

Turtle Tile interlock matting material shall be provided in the compartment.

COMPARTMENT INTERIOR - R2

The R2 compartment on the right side of the apparatus shall include the following features:

ELECTRICAL OUTLET

There shall be a 120v/10amp outlet wired to shore power and the generator. The outlet shall have a weatherproof cover and be mounted in a position to be determined at Pre Construction.

COMPARTMENT MATTING

Turtle Tile interlock matting material shall be provided in the compartment.

COMPARTMENT INTERIOR - R3

The R3 compartment on the right side of the apparatus shall include the following features:

ADJUSTABLE SHELF

There shall be two (2) adjustable shelves provided and installed in the compartment. The shelf shall be fabricated of .188" aluminum plate.

ADJUSTABLE ROLLOUT DRAWER

There shall be a 250 lb. capacity rollout drawer supplied and installed in a compartment. The drawer shall be approximately 3" deep and shall be mounted on adjustable tracks.

Provisions shall be made for the mounting of a Fire Department provided Honda portable pump and Tempest electric fan.

COMPARTMENT MATTING

Turtle Tile interlock matting material shall be provided in the compartment.

COMPARTMENT INTERIOR - A1

The A1 compartment on the rear of the apparatus shall include the following features:

600# SLIDE-MASTER TRAY

There shall be a Slide-Master pullout drawer provided and installed. The drawer shall have a distributed load capacity of 600 lbs. and be capable of extending 70% of its depth. The tray shall be fabricated of .188" aluminum plate and have a formed lip that measures 2".

HURST TOOL PUMP MOUNTING

The Fire Department Supplies Hurst Duo Hydraulic pump will need to be mounted, connected to power, and connected to the hydraulic reels in the read body compartment. Exact location and logistics of getting pump to the manufacture shall be worked out at the pre-construction conference. Mounting provision must be made by the manufacture but actual mounting can be made at the local dealer.

TOOL BOXES

There shall be a total of three (3) plastic/poly tool boxes provided. The boxes shall be ½" thick and be open topped. There shall be large carrying holes provided.

ELECTRICAL OUTLET

There shall be a 120v/10amp outlet wired to shore power and the generator. The outlet shall have a weatherproof cover and be mounted in a position to be determined at Pre Construction.

HYDRAULIC REEL

Two (2) Hannay model F2000 electric rewind reels shall be provided. The reels shall be equipped with 100 feet of 1/4" twin hydraulic 5,000 psi hose. The reels shall be mounted in compartment A1, ceiling mounted.

COMPARTMENT MATTING

Turtle Tile interlock matting material shall be provided in the compartment.

UNISTRUT

Each compartment shall come equipped with 1.625" x .875" x .125" aluminum Unistrut channel. The Unistrut shall be securely fastened to the interior walls of the compartment.

COMPARTMENT DOORS

The doors are stainless steel and approximately 2" thick and consist of a D-ring, a double weatherproof seal and shall be arranged with double latches. Each door shall be vented to prevent condensation within the compartment door walls. The latches

shall be the rotary type for secure holding and located at the top and bottom of the doors. The door pan on the back shall be closed and the latches shall be so designed that they can be removed through the D-ring opening.

The compartment to the right of the pump panel shall have a right hinged door, all other compartment doors shall be left hinged.

A door open indicator light shall be provided in the cab.

COMPARTMENT LIGHTING

Each compartment shall be equipped with two (2) LED light strips which shall provide a consistent pattern to illuminate to entire compartment.

An additional LED light strip shall be provided in compartments as specified.

DUNNAGE AREA

An open top recessed dunnage compartment shall be provided one each side of the deck gun. Dunnage area shall be constructed of .188" diamond palte.

HOSE BED

The hose bed shall be provided with aluminum slatted flooring radiused at the edges to prevent hose damage from sharp edges. Each hose bed floor section shall be removable for easy access to the water tank.

HOSE BED COVER

There shall be a black nylon/vinyl hose bed cover for the main hose bed. The cover shall be capable of being securely fastened at the front, sides and rear. The rear flap of the hose bed cover shall have Fire Department markings provided ("ENGINE" along the top, "6-13" along the bottom").

HOSE BED DIVIDERS

The hose bed shall be divided by two (2) 3/16" aluminum partitions that are fully adjustable by sliding in tracks located at the front and rear of the hose bed. The dividers shall be located as needed.

BODY HANDRAILS

Handrails shall be constructed of type 304 stainless steel 1.25 inch diameter tubing with bright finish and knurled gripping surface. Mounting flanges shall be constructed from 7 gauge, .180 thick, stainless sheet. Each grab rail shall have 90 degree returns to flanges. The ends of grab rail shall pass through the flanges and be welded to form one structural unit. The handrails, shall be mounted using 1.25" SS Hex bolts, with a barrier rubber gasket at each flange. Sufficient space shall allow for a gloved hand to firmly grip the rail. The rails shall be located in the following areas:

(Note: These are in addition to those previously mentioned in the cab section):

There shall be one (1) vertical handrail at each rear beavertail.

There shall be two (2) horizontal handrails above the pump panel, one (1) on each side as large as possible.

HANDRAIL

One (1) intermediate rubber covered handrail shall be provided below the hose bed.

HANDRAIL ABOVE PUMP PANEL

A tubular hand rail shall be provided above the pump panel.

STEPS

There shall be up to three (3) fold-down steps on each side of the front face of side compartments as required by N.F.P.A.

There shall be up to two (2) fold-down steps at each side of the rear beavertail area as required by N.F.P.A.

RUB RAILS

The body shall be equipped with heavy extruded aluminum rub rails at the sides. Rub rails shall be spaced away from the body by 1/2" polymer spacers. The rub rails shall be polished to a bright finish and be fitted with custom cast end caps.

ALUMINUM TREADPLATE

All load bearing aluminum treadplate running boards shall be .155 thick bright-annealed finish. Running boards and rear step edges shall be flanged down for added

strength. Running boards shall also be flanged up to form kick plates. All non-load bearing aluminum shall be .125" thick bright annealed finish. In areas where aluminum treadplate shall function as a load-bearing surface, there shall be a heavy steel sub-structure. This structure shall consist of 3" channel and 1-1/2" angle welded support. This shall assure that there shall be no flexing or cracking of running boards. The aluminum shall be insulated from the steel by closed cell foam body barrier material.

Treadplate locations:

1. Skirting around front bumper.
2. The step at the cab entrance.
3. The jump seat steps.
4. The body header.
5. The running boards.
6. The rear step.
7. The top of the compartments.
8. The rear of the apparatus and inside the beavertails.

SCBA CYLINDER COMPARTMENTS

There shall be a total of seven (7) spare breathing air cylinder compartments recessed in the rear fender wells, three (3) left and four (4) right. The compartments shall have brushed stainless steel doors with equipped with a weather resistant flush fitting thumb latch. The interior of the door shall incorporate a rubber seal to keep the compartment free of road debris and moisture.

PIKE POLE AND FOLDING LADDER STORAGE

There shall be a compartment off the rear of the apparatus that will store three (3) pike poles and one (1) 10' folding ladder. The compartment will have a brushed stainless steel door with latch.

SUCTION HOSE RACK

A total of three (3) sections of 10 foot long, 6" wide suction hoses shall be above the hose bed on the driver's side of the apparatus in a swing down rack. The rack shall be a Ziamatic brand and be electric/hydraulic actuated. A single hydraulic cylinder shall be furnished in the center of the bracket area with two additional pivot points, one each end. The hydraulic cylinder shall be operated by an electric over hydraulic 12-volt pump. The electric controls shall be located in close proximity to the mechanism. The electric motor control shall have a master switch and also be interlocked to prevent operation should a compartment door in the travel area of the ladder bracket be in the open position. Suction hoses shall be secured to the bracket

with locks. There shall be a red light in view of the driver to indicate when the rack is not in travel position.

Two mechanical safety locks shall be furnished to securely maintain the hose bracket assembly in the travel position. When the bracket is in the travel position, a vertically hinged door shall automatically close to cover the hydraulic cylinder and its pivot point.

SUCTION HOSE (ADDITIONAL) MOUNTING

One (1) length of 6" Hose shall be mounted on the drop down ladder rack on the officer side of the body.

SUCTION HOSE MOUNTING (2-1/2")

Hose shall be stored on the inside of the 6" hard suction lengths. Additional mounting options/contingencies shall be discussed and confirmed with the Fire Department at Pre Construction.

ZIAMATIC QUIC-LIFT LADDER RACK

The ground ladders shall be mounted on a Ziamatic electric ladder rack system so that they may be automatically lowered to a convenient height for safe and easy removal. The rack shall be made of high strength lightweight cast aluminum and be powered by two high cycle electric actuators and shall be self-locking in any position. The rack shall be capable of lowering the ladders approximately 31" from their stored position.

FOLDING LADDER AND PIKE POLE STORAGE

There shall be a compartment accissible from the rear for stroage of the folding ladder and up to three (3) pike poles.

LICENSE PLATE BRACKET

A Cast Products LP0013 cast aluminum license plate bracket with LED light shall be provided at the rear of the apparatus.

MASTER ELECTRICAL PANEL

The main breaker panel shall be wired through the master disconnect solenoid and controlled with a three-position ignition rocker switch. Circuit breakers and flashers

shall be located at officer's right side lower interior firewall with removable cover and schematic provided with notebook holder on outside cover.

A deluxe breaker panel with up to 22 ground switched relays with circuit breaker protection shall be provided.

An integrated electrical sub-panel shall be provided and interfaced to the body and chassis through an engineered wire harness system.

Twelve (12) 20-ampere and one (1) 70-ampere relay for cab lightbar and assemblies shall be provided. If the option for a mechanical siren has been selected two (2) additional relays shall be provided.

Additional four relay boards with circuit breaker protection for additional loads. Maximum two boards (8 relays) per breaker panel. All relay boards set up to trip with input from switch of positive-negative or load manager by moving connector on board (no tools needed to do this).

All relay boards shall be equipped with a power-on indicator light (red), input indicator light (green) and power output indicator light (red).

Up to 23 additional automatic reset circuit breakers for non-switched loads that are remotely switched (ie: heater fans, hood lights, etc.).

All relays and circuit breakers on the relay boards shall be pull-out/push-in replaceable.

All circuit breakers on the relay boards shall be 20 ampere automatic reset which can be doubled or tripled for 40 or 60-ampere capacity.

The system shall utilize Deutch DRC weather resistant connectors at the breaker panel, toe board and main dash connections.

All internal wire end terminals, including locking connectors, shall be mechanically affixed to the wire ends by matching terminal crimping presses to assure the highest quality terminations.

All internal splices shall be ultrasonically welded connections and all internal wiring shall be high temperature GXL type wire that is protected by wiring duct wherever possible.

All switches shall be ground controlled; no power going through any rocker switch.

Any switch controlling a relay in the breaker panel shall be capable of being set to function only when the parking brake is set. All relays shall be tagged with the function that the relay is controlling.

BODY ELECTRIC SYSTEM

All body electrical wiring in the chassis will be XLP cross link-insulated type. Wiring is to be color-coded and include function codes every three (3) inches. Wiring harnesses will be routed in protective, heat resistant loom, securely and neatly installed. Two power distribution centers will be provided in central locations for greater accessibility. The power distribution centers contain automatic thermal self-resetting breakers, power control relays, flashers, diode modules, daytime driving light module, and engine and transmission data links. All breakers and relays are utilized in circuits which amp loads are substantially lower than the respective component rating thus ensuring long component life. Power distribution centers will be composed of a system of interlocking plastic modules for ease in custom construction. The power distribution centers are function oriented. The first is to control major truck function and the second controls overhead switching and interior operations. Each module is single function coded and labeled to aid in troubleshooting. The centers also have accessory breakers and relays for future installations. All harnesses and power distribution centers will be electrically tested prior to installation to ensure the highest system reliability.

All external harness interfaces will be of a triple seal type connection to ensure a proper connection. The cab/chassis and the chassis/body connection points will be mounted in accessible locations. Complete chassis wiring schematics will be supplied with the apparatus.

The wiring harness contained on the chassis shall be designed to utilize wires of stranded copper or copper alloy of a gauge rated to carry 125% of maximum current for which the circuit is protected without exceeding 10% voltage drop across the circuit. The wiring shall be uniquely identified by color code or circuit function code, labeled at a minimum of every three (3) inches. The identification of the wiring shall be referenced on a wiring diagram. All wires conform to SAEJ1127 (Battery Cable), SAEJ1128 (Low Tension Primary Cable), SAEJ1560 (Low Tension Thin Wall Primary Cable).

All harnesses shall be covered with moisture resistant loom with a minimum rating of 300 Degrees Fahrenheit and a flammability rating of VW-1 as defined in UL62. The covering of jacketed cable has a minimum rating of 289 degree Fahrenheit.

All harnesses are securely installed in areas protected against heat, liquid contaminants and damage. The harness connections and terminations use a method that provides a positive mechanical and electrical connection and are in accordance to the device manufacturer's instructions. No connections within the harness utilize wire nut, insulation displacement, or insulation piercing.

All circuits conform to SAE1292. All circuits are provided with low voltage over current protective devices. These devices are readily accessible and protected against heat in excess of component rating, mechanical damage, and water spray. Star washers are not used for ground connections.

BACK-UP ALARM

An Preco LDA-50 automatic self-adjusting electronic back-up alarm producing 97 db shall be installed at the rear between the frame rails. It shall operate whenever the transmission's reverse gear is selected.

TAIL/STOP/TURN/BACKUP LIGHTS

The taillights are to be Whelen M6 LED style. The brake/tail lights to be red and exceed SAE requirements. The turn signal shall be populated in an arrow pattern, amber in color. The backup lights shall also be LED. One opening shall be open to accept a M6 series warning light. Lights to be installed include: 1 x M6RC, 1 x M6BTT, 1 x M6T, and 1 x M6BUW.

M6 Housing unit M6FCV4 will be provided.

PARKING LIGHTS

TecNiq LED surface mount lights shall be installed, one each side, in rear fenders, to illuminate the side and rear of the apparatus. The lights shall be wired to come on when the apparatus is placed in reverse.

LED ICC/MARKER LIGHTS

LED type ICC/marker lights shall be provided to meet D.O.T. requirements.

STEP LIGHTS

Step lights shall be provided, one each side on the front compartment face at pump panels. The lights shall be Whelen 2G Series LED lights.

Each step at the rear of the apparatus shall have a light to illuminate each step and the tailboard.

GROUND LIGHTING

The apparatus shall be equipped with lighting capable of illumination to meet NFPA requirements. Lighting shall be provided at areas under the driver and crew riding area exits and shall be automatically activated when the exit doors are opened. The ground lights shall be Truck-lite® LED model #44042C. Lighting required in other areas such as work areas, steps and walkways shall be activated when the parking brake is applied, provided the ICC lights are on.

WORK LIGHTS

There shall be two (2) Unity brand AG 6" chrome plated sealed beam flood lights provided. The lights shall be securely mounted at the upper rear of the apparatus body. Each light shall be supplied with individual switches.

OPTICAL WARNING SYSTEM

The optical warning system shall be capable of two separate signaling modes during emergency operations. One mode shall signal to drivers and pedestrians that the apparatus is responding to an emergency and is calling for the right-of-way and the other mode shall signal that the apparatus is stopped and is blocking the right-of-way. Switching shall be provided that senses the position of the parking brake.

A master optical warning device switch shall be provided to energize all of the optical warning devices provided. All lights shall operate at not less than the minimum flash rate per minute as specified by NFPA.

UPPER LEVEL WARNING DEVICES

The upper level is divided into zones A, B, C and D and the approved lighting package to be provided shall be as follows:

Zone A (front) shall have one (1) Whelen Freedom 72" Model FN72VLED NFPA 1901 compliant light bar, with twelve (12) LED modules. The light bar shall have ten (10) FLDRR red LED and two (2) clear LED heads and shall be mounted on the cab roof.

Zone B (right side) shall have one (1) Whelen Freedom Mini 28" mini light bar with four (4) light (2 corner LED and 2 inboard LR11 LED takedown lights). There shall also be coverage from the Whelen R316 LED beacon on Zone C (Upper).

Zone C (rear) shall have two (2) Whelen Model B63M7RR LED R316 beacon and integrated M7 emergency lightlight mounted on rear stanchions.

Zone D (right side) shall have one (1) Whelen Freedom Mini 28" mini light bar with four (4) light (2 corner LED and 2 inboard LR11 LED takedown lights). There shall also be a coverage from the Whelen R316 LED beacon on Zone C (Upper).

LOWER LEVEL WARNING DEVICES

The lower level is divided into zones A, B, C and D and the approved lighting package to be provided shall be as follows:

Zone A (front) shall have a stainless steel warning light housing each side with two (2) Whelen M6 Super LED red lights mounted in the front of each housing. The inboard pair of lights is in addition to the minimum NFPA warning system and shall be wired through a load-shedding device.

Zone B (right side) shall have three (3) Whelen M6 Series Super LED red lights mounted one on the side of the headlight housing, one above the front wheel well, and one on the body side at rear of apparatus.

Zone C (rear) shall have two (2) Whelen 600 Series Super LED, red lights mounted one each side of the rear of the apparatus.

Zone D (right side) shall have three (3) Whelen M6 Series Super LED red lights mounted one on the side of the headlight housing, one above the front wheel well, and one on the body side at rear of apparatus.

TRAFFIC ADVISOR

A Whelen TAM85 LED Traffic Advisor shall be provided and mounted on the rear of the apparatus. The mounting of the control unit shall be determined at Pre Construction.

BODY STEP LIGHTING

There shall be LED strip lighting (vertical) on each of the exterior corners of the body to give illumination to the fold down/cast steps on the body. The lights will illuminate with the activation of the parking brake.

BEAVER TAILS

There shall be fabricated "Beaver Tails" contructed off the rear of the body to give rigidity and structure to the rear step.

FULL WIDTH HAND RAIL

There shall be a full width hand rail (horizontal) at the top of the beaver tails

BODY PROTECTION PLATES, REAR

There shall be Stainless Steel protection plates mounted on the body in teh following areas:

Inside Face of Beaver Tails

Exterior finish of body in between Beaver Tails (from bottom step to hose bed floor

Exterior finish on compartment A1

HOSEBED LIGHTING

The hosebed shall be illuminated by a total of four (4) LED light strip.

INTERMEDIATE REAR STEP

There shall be one (1) full width treadplate rear step, 8" deep, provided at the rear of the apparatus above the rear step compartment and below the hose bed.

WHELEN PIONEER PLUS LED BROW LIGHT

A total of two (2) Whelen model PCP2 LED brow lights shall be provided. The lights shall be mounted at the front of the cab, one under each windshield

The lights shall be controlled from a single switch in the cab.

REAR SCENE LIGHTS

A total of two (2) Whelen model PCP2M^ZC LED scene ights shall be provided. The light shall be mounted at the on the rear of the body in a position to be determined at Pre Construction.

The lights shall be controlled from a switch in the cab.

GENERATOR

The apparatus shall be equipped with a complete electrical power generation system. An Onan CMHG-10000 hydraulic 10.0 KW generator shall be provided and installed. The generator and wiring shall conform to present National Electric Codes as outlined in the National Fire Protection Association Standards. The output of the generator shall be controlled by an internal hydraulic system. The generator shall be powered by a transmission power take off unit, through a hydraulic pump and motor. The generator shall be operable anytime that the apparatus engine is running and meeting the minimum range of RPM's.

The generator housing shall be composed of 100 percent stainless steel housings and have a total of four (4) air inlet locations. All connections shall be located outside the housing. The generator shall be designed to operate with an ambient temperature of 120 degrees Fahrenheit

An LCD display hour meter shall be provided. Onan display by FRC with 15' harness displays Hz, volt, amps, and oil temperature. The generator shall be equipped with a three- point vibration isolation mounting system.

The reservoir shall consist of a three (3) gallon hydraulic tank with integral filter.

Total Weight:	247lbs.
Length:	31.0 inches
Width:	16.0 inches
Height:	13.8 inches
Watts:	10000
Hz:	60
Voltage:	120/240
Amperes:	83/42
Phase:	Single

BREAKER BOX

A circuit breaker box shall be provided with sixteen (16) spaces for breakers which shall be provided as needed. All wiring shall be installed in liquid tight conduit.

BREAKER PANEL

The breaker panel shall be located in the L1 Compartment and shall meet all requirements set forth by the National Electrical Code and NFPA guidelines.

AUTOMATIC TRANSFER SWITCH

An IOTA #ts30, 30 amp automatic transfer switch shall be installed to automatically switch on board loads from shoreline power to generator power.

GENERATOR COVER

There shall be a vented generator cover fabricated with Diamond Plate provided over the generator

GENERATOR GROUNDING STAKE

There shall be a grounding stake (with provisions for mounting) for the generator. The final mounting position shall be discussed at Pre Construction.

CORD REEL

There shall be a total of two (20 Hannay Model ECR1616-17-18 electric rewind cable reels furnished and mounted on the apparatus. The reel shall come complete with 200 feet of 10/3 Seoprene Water-resistant (SOW) yellow jacketed cable. A Hannay Type "C" roller assembly and HS-3 cable stop ball shall be provided.

One reel shall be located in the dunnage area (opposite the generator), with the 2nd reel mounted in a compartment to be determined.

WILL-BURT LIGHT TOWER

There shall be one (1) Will-Burt Nightscan fold down light tower (15ft. Mast with 4 x LED lamps (120VAC). The unit shall be supplied with four (4) 120v Whelen Pioneer dual panel LED lamps (PFP2). The Nightscan tower shall be mounted on the cab roof with controls mounted on the pump panel. Used to elevate lights and/or cameras throughout widespread scene lighting circumstances, the tower offers 360 degrees of light. The light tower's functions shall including "auto stow," shall be operated by a hardwired pistol grip remote that shall be mounted in a compartment near the pump panel.

Light Tower Control Location
Relocate light tower controls in place of standard placement. Location: officer side upper corner of top mount pump panel.

CORROSION REDUCTION POLICY

It is understood that fire apparatus will operate in harsh environments. The Sutphen Corporation has in place a formal corrosion reduction program and detailed assembly procedures, designed for reducing and eliminating the possibility of corrosion. A formal program following the processes as set forth in ASTMB117, and is described below.

Frame Rails

The chassis frame rails shall be coated with a high performance, two component, reinforced inorganic zinc rich primer with a proven cathodic protection makeup preferably Cathacoat 302HB. The surface shall be clean and free of all salts, chalk and oils prior to application. Were the primer has been broken during the frame assembly process the area shall be touch up to reestablish the seal. Prior to finish paint a second primer Devran 201 shall be applied. Once the assembly of the frame is complete and the second primer is applied the entire assembly shall be covered with high quality top coat paint preferably Imron 5000 or equal.

Electro Plating

Steel and Iron brackets such as the pump module bracket shall be Zinc or cadmium plated to protect against corrosion. Plating shall be in accordance with ASTM B663.

Fasteners

In any area that a stainless steel screw or bolt head is to come in contact with aluminum or steel, painted or non-painted, the fastener shall have the underside of the head pre-coated with nylon. The nylon coating shall act as a barrier between the fastener head and the metal or painted surface.

Screw or bolt taped into the metal shall be pre-coated with a Threadlocker type material pre-applied on the threads.

When bolting together stainless steel the pan-head bolts with nylon coating under the head, a stainless washer with a rubber backing, and a Stover flange nut to secure the bolt, shall be utilized.

When mounting aluminum components such as a step to the apparatus body, stainless steel washers with rubber backing shall be used. All mounted components shall utilize barrier material between the two surfaces.

All rivet or huck type fasteners shall be of the same material being secured.

Whenever possible, holes shall be pre-drilled and taped when mounting components such as lights, steps, and hand rails prior to the paint process to reduce the corrosion opportunity. If a hole must be drilled into a previously painted surface, the paint barrier around the hole shall be re-established and a flange-type nutsert with a gasket under the flange shall b used.

When possible, the use of stainless trim screws shall be minimized. Structural tape and or adhesive shall be used were possible for mounting trim to the body or cab.

If a pre-treated screw or bolt is not available, hand applied Dynatex Boltlocker or Theadlocker shall be placed on the threads of the screw, bolt or nutsert. This will help seal threads from moisture and help prevent the fasteners from loosening. If lubricant is used when tapping the hole, the hole will be cleaned of lubricant and the shavings before applying.

Barrier Tape

Barrier tape shall be used on the backsides of all lights, trim pieces, or other components when bolting them to the apparatus; also when attaching stainless steel over an aluminum surface or when attaching aluminum treadplate to the stainless steel. All instances of dis-similar metals contacting each other require the addition of barrier tape between the metals where contact is made.

Before applying the tape, all metal surfaces shall be clean from oil or dirt with a 50/50 mix of alcohol and water or a similar solvent.

Gaskets

Gaskets shall be used under all snaps, loops and fasteners for such items as for hose bed covers. The paint seal shall be re-established around the mounting hole edges after drilling.

Rollup Doors

1 3/4" X 1/16" barrier tape shall be used on the frame opening to act as barrier between the aluminum door rail and the painted door opening surface.

Hinged Doors

Barrier tape shall be applied to the painted surface of the body and on the painted hinge side of the door.

Painting Steel

Steel shall be wiped of any oil residue, rust, and weld slag or smoke shall be removed. All surfaces shall be cleaned with solvent, primed, and then sprayed with a topcoat. After bolts are tightened to the proper torque, bolts shall be touched up with primer or cold galvanizing coating.

Mounting Emergency Lights and Options

All emergency lights, accessory mountings, Kussmaul covers, and 110 outlet boxes mounted to the body should be mounted with pre-coated Threadlocker and nylon under the head screws or bolts to minimize corrosion between dissimilar metals.

Electrical Grounding

Grounding straps shall be installed consisting of a minimum 2-guage strap bolted to the chassis frame.

A ground cable from the cab to the right side frame rail

From the alternator to the right side frame rail

From the pump module frame to the right side truck frame.

Aerials: from the hydraulic and pump module framework.

From the pump mount to the truck frame rail.

From the body module to the right side truck frame.

Proper grounding will help eliminate grounding problems, and will reduce the possibility for electrolysis and corrosion to occur, as a result of impressed current be presented to the chassis. All electrical connection points shall be sprayed with electrical sealer as necessary.

SALT SPRAY TESTING

All fasteners and coatings have been chosen after extensive salt spray testing. Salt spray tests are used to confirm the relative resistance to corrosion of coated and uncoated metallic specimens, when exposed to a salt spray climate at an elevated temperature. Test specimens are placed in an enclosed chamber and exposed to a continuous indirect spray of neutral (pH 6.5 to 7.2) salt water solution, which falls-out on to the specimens at a rate of 1.0 to 2.0 ml/80cm^2/hour, in a chamber temperature of +35C., steady state condition.

Method

Salt fog testing is performed by placing samples in a test cabinet that has been designed in accordance with Paragraph 4 (Apparatus) of ASTM B117 and operated in accordance with Paragraph 10 (Conditions) of ASTM B117.

A 5% salt solution, prepared by dissolving sodium chloride into water that meets the requirements of ASTM D1193 Specification for Reagent Water, Type IV is supplied

to the chamber. At the time the samples are placed into test, the cabinet is pre-conditioned to the operating temperature of 35ºC and fogging a 5% salt solution at the specified rate.

Orientation

The samples are placed at a 15-30 degree angle from vertical or tested in the "installed" position. This orientation allows the condensation to run down the specimens and minimizes condensation pooling. An important aspect of the test is the utilization of a free-falling mist, which uniformly settles on the test samples. This simulates a "real world" condition.

Test durations

Test durations are 500 hours, and the test cabinet will remain closed for the duration of the test.

PAINTING

All exposed metal surfaces not chrome plated, polished stainless steel or bright aluminum tread plate shall be thoroughly cleaned and prepared for painting. All irregularities in painted surfaces shall be rubbed down and all seams shall be caulked before the application of the finish coat.

All removable items such as brackets, compartment doors, door hinges, trim, etc. shall be removed and painted separately to insure finish paint behind all mounted items. Body assemblies that cannot be finish painted after assembly shall be finish painted before assembly. Both aluminum and steel surfaces to be painted shall be primed with a two (2)-component primer which is compatible with the finish coat. The apparatus shall be finish painted with a polyurethane base/clear system. "No Exception"

Utilizing the stainless steel body fabrication, the interior of all compartments, inside hose bed, and surrounding areas adjacent to compartments doors shall remain a #4 brushed stainless steel finish. This practice shall eliminate the possibility of paint chipping, and electrolysis of aluminum which can cause corrosive action between dissimilar metals. Chassis and compartment doors shall be painted the color indicated.

Prior to reassembly and reinstallation of lights, handrails, door hardware and any miscellaneous items, an isolation tape or gasket material shall be used to prevent damage to the finish painted surfaces. A nylon washer shall be installed under each acorn nut or metal screw that is fastened directly to a painted surface.

The following paint process shall be utilized:

Surface Preparation:

1. Wash surface thoroughly with mild detergent.

2. Clean and de-grease with Prep-Sol 3812S.

3. Sand and feather edge using 400 grit or finer on a dual action sander.

4. Remove sanding dust with a cleaner compatible with polyurethane base coat/clear coat final finish.

Substrate treatment:

1. Use a Metal Conditioner followed with a Conversion Coating product.

Priming:

1. Use a priming 615S pretreatment.

2. Use a self etching primer applied to achieve a 1.5 mil dft minimum.

3. Use Prime N Seal sealer compatible with polyurethane base coat.

Color Coat:

1. Apply polyurethane base coat 1-2 mil dft minimum.

Clear coat:

1. Apply polyurethane clear coat 2 mil dft minimum.

PAINT-TWO TONE CAB

The cab exterior surfaces shall be two (2) colors. The paint break line shall be at the bottom of the windshield.

There shall be a Sign Gold stripe over the paint break line (approximately ¼").

PAINTED FRAME

The frame rails and body subframe shall be painted glossy black.

AIR CONDITIONING CONDENSER

The air conditioning condenser shall be painted to match the cab roof.

LETTERING

Forty (40) 3" 22KT Gold laminate goldleaf letters, with left hand shading and right hand outline to equal 3-5/8" letter, shall be provided.

Lettering details shall be discussed at Pre Construction.

STRIPING

A 10" Scotchlite stripe shall be provided across the front of the cab and along each side of the apparatus.

"Z" STRIPE

The Scotchlite stripe shall be a mitered "Z" type on the cab sides and continuing straight along each side of the apparatus.

STRIPING, CHEVRON STYLE, REAR BODY

The apparatus shall have 6" red and yellow reflective DiamondGrade Chevron style striping affixed to the rear of the body. The striping will be set in a manner to have the effect of an inverted "V" shape. The stripe will travel low to high from the outside to the inside.

MISCELLANEOUS EQUIPMENT FURNISHED

1 pt. touch-up paint

A bag of stainless steel nuts and bolts, as used in the construction of the apparatus.

WHEEL CHOCKS

Two (2) Ziamatic #SAC-44 folding wheel chocks with SQCH-44H holders shall be provided. The wheel chocks shall be located in a area close to the rear axles easily accessible from the side of the apparatus.